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ABSTRACT

Conceptual frameworks for instructional K-12 programs in conservation and environmental education are provided in this draft curriculum guide. The objective is to help students understand cultural and social as well as physical interaction between man and his environment, interaction that, in fact, makes man interdependent with, and binds him to his environment. Sequential work units are based on cognitive-affective schemes in an interdisciplinary approach involving traditional subject areas of science, health, social sciences, arts, humanities, and also stressing other subject areas. Although school is the catalyst for environmental education concepts and values, the learning framework extends into the community, state, nation, and world. The draft is divided into three major chapters. In chapter one, statements of rationale, several ekistical situations, and an analyzed standard problem are presented. Chapter two gives conceptual outlines, including concept explications, and performance objectives. A discussion of planned instruction and teaching methods is provided in Chapter III. (Author/SJM)

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EKISTICS

A Handbook for Curriculum Development

in Conservation and Environmental Education

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Research, Evaluation and Writing

in Ekistics

(The Study of Man in His Environment)

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Chapter I

Ekistics:

Towards a Community of Experience, and Discourse

A people -- without a future -- has no need to seek wisdom, has no need to change its behavior, has no need to maintain the "health of the environment". The phrase, as Rene Dubos uses it, is no mere play on words -- and it has more than a biological thrust. For the environment of man is no longer solely the land, the sea, the wood: he has made his environment as wide as the cultures which comprise the family of man. Indeed, man's concept of environment is larger, as we shall see, than the biological concept of earth, the physical concept of planet, the cultural concept of world. Man has made so small a world that he now needs a larger mind to encompass it. The cultivation of the

larger mind is the function of education.

Education is an art-science. It is the art-science engaged in the acquisition of knowledge. But acquisition of knowledge consists not only of the ability to consolidate the knowledge which does not yet exist -- that is the unknown. Consolidation of knowledge and its pioneering occur in harmony. To increase the known and ways of knowing, to encompass the understanding and wisdom necessary for the wise conduct of life, these are both aim and content of education.

If biological evolution is the transmission and transmutation of genes, then man is possibly in control of the biological future of organisms, for he can put a stop to the life of a species. So he destroyed the dodo, so too the passenger pigeon; the Wildlife Federation presents us with a dismal array of species on their way out of man's environment and theirs. But

Too intellectual for most teachers.

we are persuaded that biological evolution is -- pari pasu -- not relevant, in the main, to the problems facing us. What we must face -- in a carefully devised encounter -- is cultural evolution, which is nothing less than the transmission and transmutation of knowledge and values. We are in control, in the main, of our cultural evolution.

Ekistics is that field of study, that community of discourse which proposes to study that area of knowledge, those concepts and values, which binds man to his environment. Ekistics is, in effect, based on the recognition by man of his dependence on, and interdependence with, the environment; further, on his responsibility for maintaining a culture which sustains a sanative environment for all those who live -- or will live.*

Call Ekistics what you will, "Human Ecology," "Conservation of the Environment," define it how you will:

---

* This definition is based on one given at the White House Conference on Natural Beauty.(1967)

------ The organization of shortage

------ Survival within the limitation of the environment

------ Stewardship of man's heritage

Ekistics* is a shorthand for a community of discourse concerning man in his environment, man in his habitation.

The discipline of Ekistics has been long in the making; it is shorthand for a host of experience, and a life-style as well. Ekistics has come of age. It is now of consummate significance in the education of man and his young. Should it not become operative in the education of all adults -- all youth -- all children?

* There is a Center for Ekistics, in Athens. The Center studies Man and His Habitations.

Ekistics: A Community of Experience and Discourse

What constitutes the proper study of man in his environment? Why not limit the study to science? To ecology? To social science? To economics? To engineering? To a variety of technologies? Our errors in analyzing the relationship of man to his environment, it is now apparent, is that the analysis has often been left to the specialist in a given field per se. Yet a study of the environment encompasses more than Science per se, or Social Science, or the Humanities. Further, Ekistics is part and parcel of the domain of citizenship, and the citizen is not necessarily a specialist. This is not to say that an ekistician has no responsibility for an area of scholarships; just as physicians are specialists, yet generalists, so are ekisticians. But just as every man is responsible for his body, so every man is responsible for the environment which gives life or death to the body. A few

analyses of a variety of decisions in altering the environment directs our attention to a more appropriate synthesis.

Item. On Mt. Shasta, the United States Forest Service is clearing the manzanita, scrubby and unsightly. The habitat of the manzanita is being altered; its place is being taken by hybrids of the ponderosa pine. The area may foster a productive and commercial forest.

Does the decision to create a new environment -- as it were -- arise out of an ecological decision or an economic one, or an aesthetic one?

Item. Tree farming is increasing. The U.S. Forest Service and private companies are developing single-spaced (pure), healthy, even aged stands of fir or pine. Regular management, short-rotation logging, chemical spraying, and other means of

cultivation eliminate entire genus and species of shrubs, perennial flowers, ferns, mosses, lichens, fungi, bacteria -- as well as insects, amphibians, reptiles, birds that depend on them. When dead trees are removed, where do woodpeckers, chickadees and the like nest? Or is this important?

Does the decision to do this arise out of concepts of economics, ecology, technology, biology; or is it, perhaps, a political decision? What are the origins of the public policy which originated "multiple use"? What is the basis for the agriculturization of forests?

Item. Any air traveller can see the smog covering the cities. Los Angeles. San Jose. Over the Sierras and the Central Valley. Not only in California; in St. Louis, the great steel arch is lost, and there are huge gray shrouds over the farmlands.

Even the Apollo 10 crew watches the plume over Los Angeles. More than 200 million tons of air-pollutants are spewed into the air over the United States. 75 million of it is carbon monoxide. A school playground sign tells the children (and the children are not surprised; and we, too, fail to be surprised): "Do Not Exercise Strenously Or Breathe Deeply."

What is the cause of smog? Is the "decision" to produce a smog a matter of biology, of economics, of sociology, of psychology?

Is it, perhaps, the result of inadequate political law and statute? Is it a failure of education? Is it a failure to understand the essential demography of an area -- or just its geography?

Item. Most Californians -- some 80% -- live in cities. The state adds about 6,000,000 people per year -- a population

?

roughly equivalent to the population of San Diego. Are not the problems coming out of this massive increase social (e.g., development of communities), political (e.g., how will they vote?), economic (e.g., how will they affect tax rolls, educational budgets), and the like?

Modern man, we are told, has carbon monoxide in his blood, DDT in his fat, strontium-90 in his bones, mercury in his tissues, asbestos and lead in his lungs. We greet the news (almost with a vast indifference -- perhaps we have become accustomed to horror) that so many cans of tuna have been removed from the shelves, so many tons of Coho salmon have died, so many tons of swordfish have been removed from the market place. And mother's milk has DDT in it. We are reassured by governmental bulletins that many of these pollutants (synonyms: body poisons) are below the control level harmful to life.

Somehow we are not amused, and somehow we are not moved to indignation. Somehow, all will be well.

Two "truths" are clear and demonstrable:

1. Man is responsible for his environment.

2. Man is fouling his environment.

Still another "truth" is patently clear: Those of us who teach do not have the luxury of doom-saying, for daily the children come to us, the very children whom we are dedicated to conserve. The very act of growth in a child is a hopeful act; schools cannot destroy hope. But teachers must educate children to face issues. If we are to conserve children, are we not equally charged with conserving the environment?

It seems clear that teachers have powerful measures: the arts of teaching and learning. To prepare the way, we need a

template of the community of concepts and values, the community of discourse we have called Ekistics. This is curriculum. For a curriculum is a reduction in complexity of the discipline -- reduced in complexity for the purpose of planning instruction. Once we have a curriculum, we can proceed to orchestrate an art of instructed learning, of teaching, of ways in which children probe or inquire into the environment, of the way in which they make experience relevant. This is instruction, or teaching, for teaching is the art which undergirds instructed learning. Teaching is the art of creating and disseminating a world of meaning; and this comes out of experience in search of meaning.

But of what ingredients, of what concepts and values, of what generalizations and principles is the study of Ekistics composed? What areas of content, which disciplines serve it? Or does it have its own bases; its own corona of problems, and

solutions. After all, our schools deal with programs, with courses, with areas, with problems -- however we define an area of study. In the past pages, we have probed several Ekistical situations. Our strategy is now to analyze a "standard" problem in Ekistics and to secure from that analysis a direction for the field of Ekistics as a community of discourse. For our purposes we take the analysis of the Conservation Foundation of June 1, 1969, in its report on environmental issues, titled:

A Classic Confrontation in California:

Citizens Move to Save San Francisco Bay.

Note that it is "citizens", the product of our schools, who did the "saving". What is it they had to do? What is it they had to undo? What problems did they face? What did they need to know? How did citizens and professionals solve their problems? How complex are the problems of the conservation of

the environment?

To repeat, our purpose is this: We shall probe into the educational directions and obligations which inform a synthesis of the field of Ekistics. Indeed, the brief selections from the report (some will think these too long) propose the ingredients of a first course in Ekistics (See Curriculum, Chapter II and Instruction, Chapter III).

The Analysis by the Conservation Foundation
A Classic Confrontation in California:
Citizens Move to Save San Francisco Bay*

One of the nation's most dramatic environmental struggles has entered a tense, crucial state in California. At issue is the future use and appearance of a splendorous estuary, San Francisco Bay.

Various cities, counties and private interests yearn to continue filling in and developing the fringes of the bay -- in the name of economic needs and progress. At odds with them are many conservationists and others who seek greater protection of the bay's natural beauty, its recreational potential and its resource values.
(cont.)

Analysis of the fields of knowledge, or disciplines, which comprise the area of Ekistical Fields Embraced
(To be Embraced in Curriculum)

1.) Social Science (Economics, geography, political science, city planning)

2.) Science (Biology, Economics, Ecology, Minerology)

3.) Humanities (Aesthetics, Ethics)

Conservation-
Aesthetics
Resources

* A Report on Environmental Issues from the Conservation Foundation. CF Newsletter, June 9, 1969.
The Conservation Foundation, 1250 Connecticut Avenue N.W., Washington D.C. 20036

The struggle has been going on for almost a decade, but it has now come to a head in the California state legislature. To the extent that the legislation fails to pass a strong protective measure, in the current session, the bay will be opened again to further uncoordinated, destructive development.

Politics

Ethics

Specifically at stake is the continued existence of the San Francisco Bay Conservation and Development Commission -- an interim agency set up in 1965 to protect the bay -- and whether it will be empowered to implement a plan for wise use and conservation of a magnificent natural resource.

Citizens' action

Conservation

Principles of Management

(cont.)

"Great and Glowing Promise"

San Francisco Bay -- including San Pablo and Suisun bays to the North -- stretches 50 miles from north to south and varies in width from 12 miles down to one mile. Much of it is surrounded by softly rolling hills, or by the low mountains of the coastal range. Through a narrow gap in these mountains, the spectacularly beautiful Golden Gate, the bay opens to the Pacific Ocean.

Humanities (Aesthetics, Ethics, Art per se, Recreation)

Social Science (Sociology, Economics, Psychology, Geography, Resource Use)

Science (Biology, Oceanography, Climatology)

For the some 5 million people living on or near its shores, and for millions of visitors, the bay is both a large and refreshing open space, and a ceaseless series

Aesthetics

Values

(cont.)

of beautiful scenes. "You always remember the first time you saw San Francisco Bay," wrote Harold Gilliam, a chronicler of the area, "....a thing of beauty and power that had somehow become part of you....No matter what your age, you were young, and the bay around you and the city beyond it were the future, full of great and glowing promise ....You felt a sudden blaze of exhiliration." — Values

On aesthetic grounds alone, the bay is a resource of inestimable value. Countless — Aesthetics
rhapsodies praise it. Put it more practically, a view of the bay can add 8-10% to — Economics
the value of a home or office in San Francisco. And of course the bay and the waterfront

(cont.)

are major tourist attractions.

But it is also many other things

which argue against allowing its shrinkage

through filling. As a place of recreation — Recreation

-- for boating, swimming, fishing, hunting,

hiking -- it is said to provide 30 million — Vacation

"participant days" each year. The bay,

including its many square miles of marshes

and mud flats, supports an extensive and — Biological Study

valuable marine life. It is also an im-

portant haven and feeding ground for millions

of waterfowl on the Pacific Flyway between — Migration (Ornithology)

Canada and Mexico.

The large bay, with its great flushing

action of tides sweeping in from the ocean and

(cont.)

out again, not only helps maintain marine life,
but is important in breaking down and disposing
of vast wastes from the area, and minimizing — Biology
water pollution. Further, the large bay sur-
face is a moderating influence on the weather. — Climatology

The bay, of course, is one of the
world's great harbors, and its rim is dotted
with ports and water-oriented industries. It
also produces important yields of commercial — Resources
fish, oyster shells, sand and salt.

THE GREAT TEMPTRESS

San Francisco Bay has always been a — Social Science (Resource Use, Economics, History, Political Science, Demography, City Planning)
great temptress. And not merely to the
sailor and fisherman. As planner Mel

(cont.)

Scott has said of the bay: "To attorneys, developers, title insurance companies, land companies, manufacturers of salt and cement, innumerable government officials, members of the state legislature and many others, it is some of the most valuable real estate in California."

Science (Minerology, Climatology, Biology, Physics)

Humanities (Aesthetics, Ethics)

And it was treated as such by the state itself for more than a century. A good deal of the bay -- including submerged lands, tidelands and marshlands -- was sold by the state to private interests, sometimes for as little as a dollar an acre. Some was filled and built upon, much more

Mathematics (Computing Skills)

City Planning

(cont.)

is still held with an eye to filling and development. Large areas were diked off and are still used as "salt ponds", for production of salt from sea water by evaporation. Still other areas were granted by the state to cities and counties for harbor, airport and other developments. In 1850, when California was admitted to the Union, the surface of the bay at mean high tide was about 680 square miles. Now the bay covers an estimated 430 square miles (though most of the reduction is not from filling, but from diking off salt ponds or managed wetlands which could be reclaimed as part of the

Management of
Resources

(cont.)

bay). Private interests claim ownership of about 22% of the bay (title in many areas is disputed). Significantly, much of this 22% is in the most critical and valuable areas adjacent to the shoreline.

Relationship of Government to Private Interests

Cities and Counties hold about 23% of the bay, and much of it also adjacent to the shore. The state owns about 50% and the Federal government the remaining 5%. Why is the bay so tempting? For one thing, most of it is so shallow it invites filling. Seventy per cent of the bay is less than 18 feet deep at low tide, and the U.S. Army's Corps of Engineers has estimated that some 248 square miles are "susceptible of reclamation."

Federal and Local Relationship

Relationship of Federal Agency to Local Environment

(cont.)

This makes it possible to create valuable waterfront real estate at a very low cost per square foot.

Also, the hitherto fragmented political juristiction of the bay area (nine counties border on its water) and the absence of regional control meant that local governments were free to act in their own economic self-interest, free from the constraints of a broader responsibility for the bay. Indeed, local officials find the bay a most convenient outlet for expanding port facilities laying on more highways, extending airport runways, and simply dumping garbage and other solid wastes.

Juristictive and Regional Control

City Planning

(cont.)

Thus there are extreme economic pressures for filling. Developers want the profits. Cities and counties want the added tax revenues. Additional pressure comes simply from an expanding population. The current nine-county bay area population is estimated at 5 million plus, a sharp increase from the 1950 total of 2.7 million. And it is expected to climb some 7.5 million in just two decades, creating added demands for housing, factories, commerce and jobs, as well as for recreation.

Relationship of
Profit to Taxes

Demography
(Population)

Pending development proposals alone would fill another 59 square miles or so of the bay and its marshes -- or more than 10%

City Planning

(cont.)

of what's left. And this can be considered just a beginning if the door to inappropriate development is reopened. Also, the figure does not include expressed intentions to fill and develop large areas of salt ponds.

Much of the bay land in private ownership has filtered into the hands of several large owners. Thus, the Leslie Salt Co. claims about 46,000 acres of salt ponds. (About 4,200 acres of Leslie holdings have already been filled to become the Redwood Shores community in Redwood City). On the east side, 3,400 acres of bay are claimed by Atchison, Topeka and Santa Fe Railway,

Monopoly

Conflict of Private and Public Interest (Political, Social, Economic)

(cont.)

which has put forth an elaborate plan for waterfront developments, including some 1,000 acres of fill. Among the municipal projects: the Port of Oakland wants to fill about 2,500 acres, mostly to expand its airport.

Social
Economic
Values

But the project which has most incensed many people is called Westbay. It would involve filling and development along 27 miles of San Mateo County shoreline, with apartment buildings, hotels, convention, education and commercial centers, port facilities, light industry and restaurants -- as well as park and recreation areas. The Westbay plan

encompasses 10,179 acres -- including 3,274 acres to be filled, and the remaining 6,905 acres "to be made available for public acquisition" for parks and open spaces. Some critics have acidly asked why the public should purchase such areas to enhance the beauty and value of privately developed lands. One comment "Westbay makes a big thing of public access and recreation, but it doesn't say this would have to be paid for by the public." Some insist that such developers should be required to "dedicate" part of their holdings for public use, as other developers often do with

Social Values

Aesthetic Values

Social Values

(cont.)

public streets, commons, playing fields, and the like. Westbay is a project of Westbay Community Associates, a blue-chip joint venture of the Ideal Cement Co. (which is providing about half of the bay acres it claims), the Crocker Land Co. (the Crocker banking interests are among the most prominent in the state), the investment banking firm of Lazard Freres and Co., and New York banker David Rockefeller and Associates. Westbay states that its plan, involving an investment of some 3 billion, emphasizes the "amenities, recreational and visual". But conservationists and others violently disagree,

Recreation

Conservation

(cont.)

charging the Westbay interests with

blatant disregard for appropriate use

of the area.

Politics - as
Resolution of Conflict

Rallying to "Save the Bay"

Communications

Public reaction to physical

threats against the bay has been strong

and relentless. Like most such citizen

movements, there was a modest beginning.

Mrs. Catherine Kerr, wife of former

University of California president Clark

Kerr, often drove foreign dignitaries

through the bay area, and they sometimes

chided her about the unattractive water-

front. Mrs. Kerr discovered one day in

1960 that her friend Mrs. Sylvia McLaughlin,

(cont.)

Social Service Sociology,
Political Science,
History, Geography

Political Science
Legislation
Government
Social Action
Conservation
City Planning
Regional Planning
Taxation
Practical Arts

Leadership and its
Characteristics

also a resident of the hills overlooking the bay, was similarly concerned with the appearance of the bay and with proposals to fill in more of it. They soon enlisted the aid of a third university wife, Mrs. Esther Gulick. They met with conservationists and others and started the Save San Francisco Bay Association.

Planning for Action
(by citizens)

The group took two important steps. First, it prompted a study by the university's Institute for Governmental Studies. The result was a book by Scott published in the fall of 1963 called "The Future of San Francisco Bay". This dramatized the threats to the bay and served as a beacon for

Research
(Inquiry)

(cont.)

subsequent efforts to protect it. Second,
the group enlisted the support of an
aggressive and influential legislator,
the late State Senator J. Eugene McAteer — Political Action
of San Francisco. McAteer, aided by the
Scott study and increasing pressure from
the public and the press, pushed through a
bill creating a commission to make an official
study of the bay problem. Working with con-
siderable dispatch, the commission reported
in a few months that piecemeal, inappropriate
development of the bay was most ill-considered.
It recommended that the bay be protected and
that a regional plan for its management be — Regional Planning
worked out.

(cont.)

Aided by Assemblyman (now Senator) Nicholas C. Petris of Oakland, and pressure by the Association, McAteer managed in the very next session the passage of a law creating the San Francisco Bay Conservation and Development Commission (BCDC). BCDC, comprised of 27 members from many fields, was charged with making a detailed study of the bay and preparing a "comprehensive and enforceable plan" for the conservation of the bay's water and the development of its shoreline. The law prescribed that the plan be submitted to the governor and the legislature at the start of the 1969 session.

Legislative Process
(Political Leadership)

Lobbying

Planning for
Conservation

Political action

(cont.)

The legislature declared in the McAteer-Petris Act that "the public has an interest in the bay as the most valuable single natural resource of an entire region". It said the bay operates as a "delicate physical mechanism in which changes that affect one part of the bay may also affect all other parts". The legislature said further that "the present uncoordinated, haphazard manner in which San Francisco Bay is being filled threatens the bay itself and is therefore inimical to the welfare of both present and future residents of the area...."

Natural Resources

Ecological Balance

City Planning

Human Ecology

It noted that "no governmental mechanism

(cont.)

exists for evaluating individual projects as to their effect on the entire bay....

Research in Ekistics

(and) a new regional approach is necessary". Thus, the legislature declared, "it is in the public interest to create a politically responsible, democratic process by which the San Francisco Bay and its shoreline can be analyzed, planned and regulated as a unit".

Regional Collaboration

Democratic Process

Even more important, and to widespread surprise, the legislature gave BCDC some potent muscle during the study and planning period: it required anyone wishing to fill any of the bay to obtain a permit from BCDC. And it specified

(cont.)

Granting of Authority;
Social Responsibility

that a permit be granted only if a project is (1) "necessary to the health, safety or welfare of the public in the entire bay area," or (2) "of such a nature that it will not adversely affect the comprehensive plan being prepared."

Health

Thus for four long years BCDC was empowered to put the brakes on filling and development. (BCDC has not insisted on a complete moratorium; it has allowed minimal filling -- a total of 370 acres as of this spring, including 265 acres for airport expansion.)

A Remarkable Document

What Aspects of Living Does This Plan Affect?

With a staff of 10, plus outside

(cont.)

consultants, and at a cost of some $75,000 in appropriations, BCDC completed its plan and submitted it on schedule in January of this year for consideration by Governor Ronald Reagan and the legislature. Some conservationists charged that the plan embodies several unfortunate compromises. Would-be developers criticized many of its provisions in unmistakable terms. But by and large it has been acclaimed as a remarkable plan -- a far cry from the usual planning document couched in unclear, idealistic and platitudinous generalities. The BCDC plan could well

(cont.)

The reader will note that the plan ramifies the life of the community and individuals as well.

Some groups and affected categories (in the order of the account):

Conservationists

City Planners

Engineers

Home-makers

Contractors

Industrial Laborers

Biologists

Recreation specialists

Meteorologists

Climatologists

Tax specialists

Contractors, Realtors

Port facilities and services

Communication

Transportation

Local Development
(including zoning)

Researchers in Ekistics

serve as a model for the nation's other estuaries and coastlines. Some of its principal recommendations and policy statements:

* "The most important uses of the bay are those providing substantial public benefits and treating the bay as a body of water, not real estate."

* "All desirable, high-priority uses of the bay and shoreline can be fully accomodated without substantial bay filling, and without loss of large natural resource areas. But shoreline areas suitable for priority uses -- ports, water-related industry, airports, wildlife

(cont.)

groups and categories affected (continued):

Regional Development

Industrial Arts

Horticulture

Landscape Design

Architecture

(To maintain the bay there is a requirement for professional and vocational skills that would strain the resources of all but a technological society.)

refuges, and water-related recreation

-- exist only in limited amount, and

should be reserved for these purposes."

* The plan proposes minimal filling, a maximum water surface area, and maintenance of high water quality and adequate fresh water inflow. Purposes: to benefit recreation and scenic enjoyment, to maintain fish and wildlife resources, to lessen water pollution and to moderate the weather. To this end, the plan also calls for maintaining and restoring marshes and mudflats and recommends that the diked salt ponds and managed marshlands (most used as duck hunting preserves) not be converted into urban developments.

(cont.)

This could be done by property tax policy, public purchases of the lands ("man's last substantial opportunity to enlarge the bay rather than shrink it"), or possibly by purchase of "development rights".

* The plan proposes the reservation of some 19,000 acres of additional land for industries specifically requiring waterfront sites, with the locations specified in a series of maps.

* The plan proposes expansion of some port facilities, to "keep San Francisco Bay in the forefront of the world's great harbors". But, it says, any dredging or filling "should be in accord with an overall regional port development plan".

(cont.)

* The plan proposes a regional airport system. Pending its completion and the building of "reliever" airports in the region, new general airports should be built away from the bay, and expansion of existing airports into the bay should be permitted "only if no feasible alternative is available".

* The plan offers detailed recommendations for providing recreation -- marinas, boat launching ramps, fishing piers, hiking and biking paths, beaches and commercial recreation facilities oriented to the water. The plan includes about 5,000 acres of new parks on the waterfront. Recreation needs were projected

(cont.)

50 years ahead. But the BCDC noted that even if all these marinas, parks, beaches and the like were established, "there would still be only a small part of the shoreline open to the public". Therefore it recommends that "maximum feasible opportunity for pedestrian access to the waterfront should be included in every new development in the bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, or other use". The plan includes guidelines for attractive development of the bay shorelines. Similarly, it calls for drives and "vista points" to take maximum advantage of scenery.

(cont.)

On the basis of this summary (only part of the report), what skills, knowledge and attitudes do students need to redeem resources and inquiry into environmental problems?

Sydney Howe, Acting President of the Conservation Foundation, concludes the report with this statement:

"There is much at stake in San Francisco Bay."

Few if any other natural resource decisions being faced across the nation concern the daily lives of millions of persons so directly. Nowhere else in the nation is a complex resource issue which has had so thorough and truly ecological an investigation now facing decision. This investigation was conducted by specialists from all appropriate disciplines, under control of commissioners

(cont.)

1. Basic knowledge of the natural environment and its resources (biology, ecology, geology, astronomy, oceanography) and man's interdependence with it. (ecology, philosophy, physical and mental health, aesthetics).

2. Knowledge of the basics of environment technology (soil and water conservation, forestry, agriculture, minerology, wildlife management, mathematics) and the skills of resource conservation (practical arts, industrial arts, home economics).

3. Knowledge of the Social Sciences as they affect the environment and its resources (philosophy, economics, political science, geography, sociology, history) and the social skills of conservation (consumer economics, citizenship, current events, and contemporary issues and law).

drawn by law from the jurisdictions affected. The Bay Conservation and Development Commission plan is a landmark achievement in both land-use planning and regional consensus.

4. Clearly, Ekistical content must be a part of the total school program in all appropriate subject areas and grade levels and should relate directly to the lives of the students.

It is doubtful that those who strive for environmental quality have ever approached a major land and water system more responsibly. Yet the forces backing massive bay-fills and opposing BCDC still include leading businessmen who are respected for good civic works. Ironically, one would-be filler of San Francisco Bay is reported to have observed recently that the United States

(cont.)

would not now find itself waging quite so desperate a battle against pollution if business had listened more closely to conservationists and ecologists in the past.

Surely, conservationists and ecologists are not infallible, but their cautions are just as roundly pooh-poohed by San Francisco Bay development interests as were similar warnings of 20 years ago that pollution and blight would diminish all our lives. We must stop adding to the environmental casualty lists, and San Francisco Bay is a good place to draw the line.

The thrust of our analyses and syntheses is clear. Ekistics is first and foremost a field which is of wide general appeal and effect; it is pervasive in modern life.

Second, it is essential to the education of <u>all</u> citizens.

Third, it is based on a variety of disciplines and depends on a variety of disciplines (For example: reading, writing, mathematics, communication (by speech), a knowledge of modes of social and political action, of interacting groups, of personal action in social, political, ethical, aesthetic matters, the role of persuasion and the role of leadership and followership are clearly demonstrated. Withal, a utilization of the modes of problem-doing and problem-solving. And so many other skills -- not excluding the skills of beautifying the home and room, of land and garden.

Our environment cries out for rescue. Our cities are in decay. The problems call -- not only for enlightened citizenship -- but for a sense of mission. Ekistics is to convey not only knowledge, skills and attitudes -- but a sense of mission.

Consequently, Ekistics is not the property of any content area -- science, social science, mathematics, the humanities. Nevertheless, Ekistics embraces significant aspects of these.

Whatever environmental problem which we analyze: Los Angeles smog, water for the Central Valley, the conservation of wilderness, the growth of ugliness in the city, the multiple use of forests, "The Automobile", population, pollution of pesticides -- we find their roots, stem and foliage in:

------- Social Science

------- Science

------- the Humanities.

We are forced to conclude that the area formerly called Conservation, because of its significance as a community of discourse, as a discipline contemplated, and productive of the change in behavior resulting from the social action we call education, has been barren because of its meager analysis and synthesis of the issues with which it must deal. If we are to save the Trumpeter Swan or the Sequoia, are we not faced with ethical choice, as well as economic, and scientific -- not to exclude those we call aesthetic and ethical. For example, is it ethical to expend resources in saving the Trumpeter Swan while Indians live in squalor? Shouldn't we do both?

If we are to try to approach zero population growth (zpg) -- as some would advocate -- do we not face vast economic, social, political, scientific, ethical, aesthetic -- and, of course, epistemic problems?

If we wish to call the area of our concern conservation, then we must enlarge its boundaries. In our estimation, conservation is too narrow a term for the activities of the true conservationist -- for he was concerned with nothing less than the total environment -- not the narrow ecological one -- and as such his domain was as large as life and living.

Nothing less will do than to synthesize a fresh area of study, deriving from a central issue of modern life: man's concern with the maintenance of a culture which sustains a sanative environment. We proceed then to examine the nature of a curriculum in Ekistics. It is not strange that all falls into place. For man is ready to redeem and reclaim his environment. In so doing he will redeem himself. No less.

Chapter II

Curriculum:

Towards Reduction of Complexity

It is too easy to be overwhelmed. The times demand ingenuity -- not to say expertness. But expertness demands restraint -- for the expert seeks constraints based on his art and science. What are the constraints of that community of discourse we have come to know as Ekistics? What are its concepts -- its values -- its modes of inventing and initiating action?

Ekistics is concerned, as we have indicated, in the health of the environment. Its practitioners -- whether scientists, economists, city planners, architects, out-of-door educators, might well consider themselves ekisticians, if they would heal the environment. Physicians heal the body; ekisticians, the

environment. Medical plans are plans for treating the body, or the health of a community; they are preventive or remedial. So, too, ekistical plans; they prevent or remedy mistreatment of the environment -- or its maiming. Ekistics, properly applied, maintains an environment, an ecological balance in all its beauty and sanative nature.

Ekistics has its knowns. Ekistics has its unknowns as well.

How does a society -- and its schools -- come by their knowns? How does a child consolidate experience?

How do we probe our unknowns? How do we pioneer knowledge?

As we shall see, a society's knowns and unknowns come not only out of the modes of empirical validation we have come to expect of the scientist, but also out of the non-empirical validation of the artist, the philosopher. A forest is an ecological entity; it is also an aesthetic one. The decisions and

problems which are ekistical come not only out of factual theory (what is known, verifiable, and predictable), but out of normative theory as well (what is and what ought to be).

Our present purpose is to concern ourselves with curriculum, leaving instruction to a later discussion; this is merely a preference for a plan of procedure. We probe the constraints of the domain of Ekistics under the following heads:

1. Mental Constructs As Adaptations: Concepts and Values

2. Cognitive Frameworks -- and Instructed Learning.

Mental Constructs As Adaptations:
Concepts and Values

All of us -- in one way or another, in effective mode or not -- are adapted to our environment. We are adapted by our genetic inheritance, and our cultural inheritance as well. Once born, we are limited by the constraints of physical structure; we can realize its full potential through our adherence to what is known of health -- adequate exercise, rest, and utilization of medical and dental advice. We can do much about our cultural inheritance; individuals can, and do, change their behavior. But soon we develop our adaptations to our society -- to our culture. We recognize that biological evolution and cultural evolution both have made man what he is -- but not necessarily what he will be.

Generally speaking, physical adaptation is, for man per se, no longer of as great significance in terms of survival value as is his cultural adaptation -- his concepts and values. There is a horde of evidence which supports the claim that what happens to men and women in their school years, the concepts and values they hold, and the behaviors they prize, presage what they do -- or what is as important --- do not do.

We speak of the "problems" posed by pollution, population, pesticides, pressures on resources. Why doesn't everyone recognize these as "problems"? Precisely because the framing of a <u>problem</u> -- in counterpoint to the framing of a <u>question</u> -- is an art requiring great skill. An ability to recognize and clarify problems is precisely an ability to frame and penetrate into strategies for solution: there is all the difference in the world between asking a question and framing a problem.

Mental activity is generally directed by objects and events. It is apparent that if the object or event (say, in a given environment) is not recognized, a problem concerning the environment is not clarified. Not everyone recognizes a pollutant. Indeed, it seems clear that an object or event is recognized only when the concept to which it has relevance is understood. Otherwise, the problem may not be clarified. To most of our population, problems in conservation of our resources, pollution, pesticides, population, pressure on resources, are not clearly perceived in advance of their occurrence. And this because the ekistical base, in fact and nature of evidence, in concept and values undergirding the conservation and preservation of environments, is not understood.

In our past searches, consisting of visits to 1,092 school systems over the past five years, (and study of over

2,400 curriculums, 375 in California schools), we have uncovered this significant datum: Every school system (elementary and secondary) embraces conservation in its stated curriculum. But if one examines what actually goes on, one finds in about 65% of the cases that the topic is not considered -- and this mostly in city high schools.

Particularly in city high schools, conservation is thought to have little importance and relatively little intellectual rigor; hence, little respect. Besides it is "covered" on TV -- and magazines -- and in publications by a hundred or so organizations. Besides that, in a city, what fields or ponds or streams are available for that "necessary" field trip?

In rural schools, experiences in conservation are thought to be generally unnecessary. Everyone "lives", so we think, in

the out-of-doors. There one is expected to reap its benefits, as well as its concepts and values, without effort. Since the rural livelihood is based on conserving the land, conservation should be "bred in the bone." Our observations are -- that the experiences of conservation are part of rural life, but the concepts and values may not be. The country town is not always beautiful; the automobile may be junked amidst the wild flowers. The barbed wire protecting cattle may be hooked on trees; the ever-present hunter may kill the song-bird; weeds (successful but unwanted plants) clog the cultivated garden or vegetable patch; the examples are countless. The evidence of the value of out-of-door education (out-door education) is not available, or not clear; nevertheless, the hope of its effectiveness is ever-present.

In any event, more than any other curricular area, conservation is honored in the breach. This would not be possible

if the ecological, economic, and psychological concepts underlying practices in conservation ramified, or pervaded, the curriculum -- a curriculum in Ekistics.

At other times, conservation education is often synonymous with the occasional walk in the woods, or what is worse, a natural trail, for the trivial naming of specimens (rarely their study); for the remnant rules of an outmoded agricultural economy, for a set of "don'ts". Too often, the "field trips" are conducted by agencies outside the school; the "field trip" is <u>that</u> bus trip to a kind of concentration camp for organisms which cannot otherwise survive. This is not to deprecate the bus trip; only its effectiveness. The field trips are not, generally, experiences in search of meaning; they are not part of a curriculum or community of discourse.

What is more, nobody -- in the past -- really thought conservation to be important. One did not write books "what can't Johnny conserve". No one was truly indignant about a child's inability to see beauty in his environment.

And each year the cities grow uglier. The smog is to be seen everywhere. The environment is fouled.

As conservation became crucial in the mind of the public and its leaders, the question was not "Was there a real place for conservation?", but how conservation attitudes could be "propagated most effectively". But too often the attempt could more closely be fitted into the realm of propaganda -- rather than concept-seeking and value-seeking.

Concepts and values are anvils on which philosophies, policies, and practices are forged. But meanings, understandings,

concepts, and values must also be related in a structure; in effect, a curriculum constructs a kind of human ecosystem in which the various parts are interrelated. That is, a school has structure and it develops educational structure through curriculum. To "see" and understand structure is to see the interrelatedness of things -- whether parts of an ecosystem, or parts of a city, or parts of a plan for the revival of home -- or city -- or of a garden in a flower-box.

We propose then to develop first a structure in which the teacher finds scope as well as sequence -- but in the main the mental constructs -- of a curriculum. A structure, in which intellectual disciplines thrive, does not limit; rather it furnishes psychological safety and freedom for the widest experience in search of meaning, whether that meaning is gained from the non-random experience of instructed learning, or the non-directed learning coming

out of random experience.

True, a child is born alien -- but he is born to another human being. If the child lives in the cultural environment of a family, his adaptations come to be made of a variety of experiences. We may class them to two categories:

<u>random</u> and <u>non-random</u>.

For example, a touch of a <u>hot</u> radiator may be a <u>random</u> experience from which he will learn (it is hoped). On the other hand, his early -- and later -- experience in religion may be <u>non-random</u>. That is, the experiences are mutually, at least, directed by others. His religious experience is indeed learned but the <u>form</u> of experience on which his learning is based is significantly different from that of <u>random</u> experience. His religious experience is directed; it is in effect, <u>instructed</u>

learning. The instruction is planned and effected through agencies concerned with a general mode of instruction, in which the mode of concept-seeking and concept-forming is planned, and the concepts and values are within the plan. In planning a curriculum we are, in the main, concerned with instructed learning, (based on non-random experience, that is, planned experience), as well as with random experience which might occur outside of the school environment. For example, the school has the child from 6/24ths of the day; it is not necessarily responsible (outside of the assigned work, or work catalyzed by exceedingly interesting experience within the school) for the remaining 18/24ths of the day.

Neither is it useful to assume that learning -- or what is learned -- is synonymous with what is taught, or what is the result of education. Schooling is neither synonymous with education,

nor with learning. Schooling is, in large part, a result of instructed learning. And instructed learning depends in large part on that construct we call curriculum.

Surely the scholar (whether natural, social or behavioral) doesn't arise "new" and inexperienced of a morning, exclaiming, "What new discovery shall I make today?" His problems arise out of prior concepts, out of prior values. When he is confronted with an object or event which does not fit his conceptualization (however wrong the latter may be), he may recognize a problem. But this ability to recognize a problem almost always comes out of prior experience and the concepts gained out of the experience. Understanding, that is possession of a concept, and its consolidation in understanding, is antecedent to recognition of a problem.

Once -- a long time ago -- facts seemed so relatively stable. Now there is not only a population explosion -- but a

knowledge explosion. We are told, by those who calculate these data, that every day different kinds of information, filling some 40 encyclopedia-size volumes, are forged by the scholars now at work. With the assistance of computers, of course. Mere facts seem no longer to hold their authority. While there is nothing mere about facts, it is also true that facts per se are inundating us to an unconscionable degree. Thus, we calculate, it would take an omnilingual scientist to the year 3363 to read all that was published in 1964 -- if he worked eight hours a day without lunch. Clearly, the explosions of population and of knowledge are running neck and neck.

The point is that the school can no longer be a place where the "facts are covered". The point is that part of the early sanative environment we call "school" must be a place where the the student learns an art which prepares him for acquiring knowledges,

skills, and even attitudes which are not yet known or even in demand: that art should prepare him for a world whose technology does not presently exist. Is this possible? We would affirm this. Yes.

Newton stood on the shoulders of others, one scholar is interdependent with the community of scholars who came before him; one concept stems from another. Concept replaces concept, but this rather slowly for a concept is based on prior networks of inferences and on prior observation of objects and events -- and behaviors.

To be specific. The term "mammal" evokes different objects, horses, dogs, cats, pandas, elephants, kangaroos come to "mind"; also different events, suckling of young, and the like. A little individual experience is worth undertaking to press home the point. Suppose I were to ask you to think of a forest; closing

one's eyes helps. One might "see" in the "mind's eye" a familiar forest, or woods, or a clump of trees. One usually doesn't "see" an ocean, or river, when one asks for "forest". Similarly, per se one doesn't "see" a mammal, or fish, or town meeting, or family, or tax structure, or planned community. "Forestness," if you will, is a concept. So is "mammalness" a "family".

A concept is a network of inferences stemming from critical observation of objects and events, leading us to "class" our objects and events. The concept enables us to identify as yet unobserved objects and events. In short, a concept isolates common attributes of objects, events, and behavior. Values, on the other hand, isolate common attributes of objects, events, behaviors, we <u>prize</u>.

Thus we prize the beauty of wilderness and its peace; we prize the song of a bird, or the prattle of a child; we prize,

that is we value, liberty, freedom; we value education.

Thus erosion, smog, population, markets, energy, city, Ming Dynasty, house, pollution, deficit spending, ecosystem, young river, taiga, flood, plain, pesticide, romantic poets, Elizabethan era, Neanderthal man are concepts. Taxonomically concepts can be brought under a larger head "conceptual schemes," and ordered into sub-concepts, etc. (See pages 86 and 149.)

The possession of concepts helps us to associate or combine, as well. Thus the goose, frog, and rabbit are also vertebrates; the inclined plane, pulley, and lever are also simple machines. We expect a goose to have feathers and a warm body, and to lay eggs; these are associated in the concept "bird". Population is yet an entirely different mental geography; yet for others, with wider experience, the two are related within another concept, population pressure. Concepts, therefore, help us combine, or

associate, or synthesize also. The area of Ekistics is a congeries of concepts.

We turn to an examination of values -- the affective area as distinct from the cognitive, although the areas cannot be truly distinct since both "reside" in mind.

Values are affective criteria; they are standards of what a person feels to be desirable, what he prizes. Values function when a person has uncertainty about his behavior, the choices which confront him in making a judgement. Values are needed to make value judgements, that is, judgements about the desirability, fitness, or quality of an object, or event, or behavior.

Mainly, values come into play when there is insufficient information. When there is precise information, and adequate evidence, we do what we must. Values are predominant in pressing an action when

knowledge is inadequate, or unavailable. Values come into play when there are two or more choices -- each of which has possibilities for action. In its simplistic sense, the choices available in the conflict of values over the proper utilization of San Francisco Bay were "to fill" or "not to fill".

Further, values come into play when there is a value conflict. Not only must there be valid and possible choices, but there must be some degree of value conflict within the individual's own system of values. A particular value in the person's value system may invite positive action to one alternative, and another value in the same system may signal danger. Thus -- again simplistically -- economic values were in conflict -- "to fill" might realize more income; "not to fill" might realize more income.

Value judgements may come coercively into play where there

is a choice that must be made. There is no escape. Thus, the judgement on whether or not to fill the Bay had to be made.

Usually, values are the result of sharing; other people have a part to play. Values are first learned from family, the child's early environment. Value conflicts are conflicts with the values of other people -- not of inanimate objects. Values are affirmed, or not; not proven or disproven -- as are concepts.

We can and do make judgements without all the facts -- especially when all the facts are not available. We do not always have a full understanding, that is, all of the conceptual framework, or all of the data, yet decisions must be made. Concepts and values merge in any decision.

Concept seeking and value seeking together with their ends, become a legitimate objective of the teacher. Concepts and values

are joined in the cognitive-affective schemes which undergird a Curriculum in Ekistics. For example, a cognitive-affective scheme, such as interdependence, involves many concepts such as photosynthesis, symbiosis, community, irrigation, city planning, resources, and the like; and values, for example, respect (e.g. for individuals, for property); equal rights (e.g. political, legal), responsible action (care of soil, water, house, street).

A major objective of teaching in Ekistics is to foster understanding of the major conceptual schemes which scholars have developed. Curriculum planning and lesson planning are simplified when teachers consciously undertake to develop a course of study around the major conceptual schemes of the area being considered, and to plan their daily work around the concepts underlying these conceptual schemes. The laboratory, the field, the classroom then become places for discovery, for discriminating

and associating data into facts, facts into concepts, and concepts into conceptual schemes, and for the testing of values.

It is almost obvious that individuals could not discover for themselves all the cognitive and affective schemes already known, and probably not even all they need for daily living in our society. Hence, the need for teaching and teachers to recreate efficiently for the young the heritage of the past -- both in attained cognitive-affective schemes(the product) and in the means of attaining them (the process). We shall develop the thesis later that this is best done through experiences in which thought is related to action, i.e., through investigation, through instructed learning, through individual probe -- apart from the teaching environment. In this way, children may have opportunity to acquire the apparatus of attaining the conceptual schemes of the future.

It is, in short, our proposition that the very nature of

learning, as we understand it at present, consists of concept-seeking and value-seeking activities leading to concept and value formation. The concepts and values formed are to be so important, so functional, that their understanding and application leads young people to live more effectively. Concepts and values along with the activities and objects which illumine them, are the content of our curriculum. Concepts and values, in fact, undergird action -- as well as understanding.

Cognitive Frameworks -- and Instructed Learning

A cognitive framework can be developed to give education intellectual discipline; that is, a network of inferences, of relationships can give structure to a curriculum. Further, as we shall see, the constructs, affective options determining decisions, in a word, values, are part and parcel of the cognitive-affective schemes -- and are inseparable from them. Nevertheless, to learn structure is to understand the relationships of objects and events to each other. The interrelatedness of a community of discourse (such as Ekistics) can be demonstrated, that is, the knowledge can be disciplined so that the way further knowledge is acquired has discipline. This is, of course, meaning in "discipline"; the latter does not have the same meaning as "sequence of courses".

A discipline is acquired through disciplined study; a

discipline -- as a study -- is never haphazard, nor are its modes helter-skelter. Students "acquire" the "discipline" -- that is, the constructs of Ekistics -- and skills through probing, through investigating, through enquiry; this simply means that students must expend energy in learning. He is not robbed of the right to bend his own efforts to uncover the concept, nor of the "pain" or effort necessary, or if you wish, to "discover" the concept. The teacher's art is expended in preparing the learning situation in which the investigating occurs. But we digress; this is the burden of our discussion in a later section (Instruction, Chapter III).

We mean to say that experiences in early education lose meaning if they are helter-skelter and subject to whim. We mean to say that early education in Ekistics can be based on a structure which is sound because it is built on concepts and values; hence the elements of the structure are related and relevant. They are

the warp and woof of the art-science we call Ekistics. Those who will conserve need grounding in the full scheme of man's past, not in the parochial specifics of conservation or preservation of land, or water as practiced in an agricultural economy which was valid for the last century. Ekistics is relevant to modern life -- and the problems and successes of the future.

Furthermore, the structure of concepts gives meaning to experiences since its constructs (concepts and values) pervade the school experience, that is, the curricular structure in which the experiences take place. It is otherwise when unrelated bits and pieces are stashed together in a period of time, through a sequence of topics unrelated in structure.

We should be remiss in our responsibility if we undertook certain assumptions current to some curriculums. We shall <u>not</u> assume that children can be prepared to meet the problems of

maintaining a sanative environment, by taking a course, or a week in the out-of-doors. All data coming out of investigations in curriculum and instruction, in teaching and learning indicate that a study affecting life and living should pervade life and living. This should mean, and does, that the concepts and values pervading Ekistics should pervade growth. This means further that work and study in Ekistics is part and parcel of the elementary, junior high school, and high school years. Proposals will be made for work and study in each of these periods of schooling.

The conceptual pathways can be laid in the primary and and intermediate years. In our investigations in the Social Sciences, Sciences, and the Humanities we have found children able to probe the sinews of major concepts in the primary and intermediate years. True, they may cross the conceptual rubicon (see Chapter III) at different times, usually in the intermediate

years but without the basic probes in the primary years, it is doubtful whether they would cross the conceptual rubicon as early.

Further we will propose that in the intermediate years, and in the junior high school years -- a concentration, a synthesis of two out-of-door operations be consummated:

a) in the intermediate years, a concentrated experience in the out-of-doors with a view to testing an understanding of ecology in a "natural" environment. By "natural" we mean an environment dominated -- at least in area -- by plants and animals still growing in a verifiable ecological relationship not yet disturbed by man. A concentration of study (analysis and synthesis) in the field (the green) is thus possible. This might constitute a one-week or several-week camping experience or regular field trips.

b) in the junior high school, the major concentration might

well be a study of village, town and/or city for purpose of studying the relationships in a city environment. A concentration of analysis and synthesis of problems in the field (the city) is thus possible.

In the senior high school, we shall recommend a full year course, available to all students, in Ekistics. The study would span many fields -- Social Science, Science, and the Humanities -- and should use all manner of communication skills (verbal, numerical, artistic and the like). The course might be given as an entity by one teacher, or several -- with different special knowledges, skills and concerns -- in collaboration. (See Chapters II and III).

A Curricular Framework in Ekistics

------ For the Elementary Years

------ For the Junior High School

------ For the Senior High School

The cognitive-affective constructs (concepts and values) which form the framework of Ekistics are plotted in the pages following. As will be seen, they are plotted as conceptual pathways -- pathways from experiences at the first level to later levels (say 5th and 6th level) -- and junior and senior high school.

Where examples of performance objectives (synonym behavioral objectives are discussed) (ChapterIII) they will be seen to have application not only to schooling, but to home and community.

Level 6.	Man is the prime agent of change of the "natural" environment.
Level 5.	The environment is in continual change, in present and past ages.
Level 4.	Life converts matter and energy into characteristic species form.
Level 3.	Life and environment interchange matter and energy.
Level 2.	There are a variety of environments, each with characteristic features and life.
Level 1.	In any environment, living things have similar needs.

Cognitive-Affective Scheme	Man is interdependent with his natural and physical environment.
Conceptual Pathway A	Interdependence -- In Interchange of Matter and Energy

Level 6.	Man modifies the environment in order to utilize his resources -- and increase them.
Level 5.	Social aims determine the utilization of resources.
Level 4.	Men interact to utilize the world's available resources.
Level 3.	Men utilize the environment to secure their needs.
Level 2.	Men develop different modes of adaptation to life in different environments.
Level 1.	Men live in different environments.
Cognitive-Affective Scheme	Man's social behavior is basic to maintaining, altering, adapting, or destroying the environment.
Conceptual Pathway B	Interdependence -- In Social Interaction.

Level 6.	Men recreate the environment.
Level 5.	Men create objects, events and behaviors which satisfy their images of beauty, or order.
Level 4.	Cultures are characterized by their special ways of reacting to the environment.
Level 3.	Men, responding to special environments, create objects and events symbolic of their interaction.
Level 2.	Men seek out objects, events and behaviors symbolic of beauty.
Level 1.	Men interact mentally and emotionally to the objects and events in their environment.
Cognitive-Affective Scheme	Man utilizes his symbolic and oral traditions to maintain or alter the environment.
Conceptual Pathway C	Interdependence -- In Cultural Components and Forms

A Conceptual Framework In Introductory Ekistics

(For the Junior High School)

Each Cognitive-Affective Scheme embraces a unit of work within four areas of the curriculum:

------ Social Science

------ Science

------ Humanities

------ Health

------ And uses all verbal, mathematical, artistic skills.

(The appropriate placement of each unit depends, of course, on the curricular planning of the school.)

(cont.)

Cognitive-Affective Scheme I - Societies perceive environmental issues of their time on the basis of past experience.

Cognitive-Affective Scheme II - The interaction of the culture with available technology determines the nature of the environment which is planned and developed.

Cognitive-Affective Scheme III - Social issues and decisions alter the environment.

Cognitive-Affective Scheme IV - Social issues and decisions determine the utilization of all resources.

A CONCEPTUAL FRAMEWORK FOR EKISTICS

(A Course for the High School)

Cognitive-Affective Scheme I - In any given environment, organisms are linked within an ecosystem.

Cognitive-Affective Scheme II - Issues and decisions affecting the world ecosystem reflect the pressure of population upon resources.

Cognitive-Affective Scheme III - Wise utilization of the environment is dependent on the organization of shortage.

Cognitive-Affective Scheme IV - The concepts and values man accepts as guides to his future behavior determines the quality of his life, if not his survival.

Explication of the Conceptual Framework and Conceptual Pathways

We have made the case that the term "environment" as applied to man's interdependence with it, is not a viable one if it constitutes only his relationship to a biological or natural environment. A bridge or house is as natural to man, as a bee-hive and honeycomb is natural to a bee. Man's environment is not only biological and cultural; it is aesthetic; it is ethical; it is economical; it is social; it is political. It is the forest, the sea, the prairie, the farm, the factory; it is his city; it is his home. We speak not only of pollution by pesticides, but pollution by noise; not only of destruction by flood but by the bulldozer; not only disrepair by natural erosion but by man's willful neglect; a gullied field is ugly; so is a city speckled with refuse.

Experience in Ekistics, it must be strongly emphasized, is not to be confined to the school; the school is the catalyst. To repeat, the school is only the catalyst. For example, even now a group of citizens -- among them students -- are patrolling the Santa Barbara Islands in a useful and effective attempt to conserve the sea lions. Their example educates, and catalyzes other action, does it not?

Recall that for the elementary years, the community of discourse is the entire elementary curriculum; Ekistics pervades its very fiber. Reading, Arithmetic, Social Science, Science, Literature, Physical Education, Music, Art -- all are pervaded by it. Recall that for the Junior High School we propose a redirection of analysis and synthesis -- a concentration in four major Cognitive-Affective schemes, in an Introductory Ekistics. This might be given over a period of the three Junior High School

years, or two -- or might be pervasive throughout the present curriculum of the three years. Finally, we propose a full year's course in Ekistics in the High School.

What follows is a definition of each Cognitive-Affective Scheme and its Supporting Concepts -- which are in a framework we have called a conceptual pathway. The thrust impelled by definition and sampling of content under each Cognitive-Affective Scheme and Supporting Concept is meant to be a probe into the environment of each concept; it is not meant to exclude experience which students of the special area -- having given it profound thought and study -- would claim for it. Neither would we defend the terms or phrasing per se in which the concept is couched; surely there is a more felicitous construction. Further, it is clear, that for purposes of convenience, and for convenience only, we assign definitions for Conceptual Pathway A, which

emphasizes Science, for Pathway B, Social Science, for Pathway C, the Humanities. Level 6 in each strand is given over expressly to a synthesis of the three areas.

BUT the teacher is one person, who plans all instructed learning, and it is only natural that synthesis will be planned for each level. Our definitions do not delimit the areas, they signify the others in easy interrelationship.

We have offered these definitions, thrusts, or probes, not as encumbrance or hindrance but as vade vecum to those responsible for, and responsive to, the construction of curriculum.

Conceptual Pathway
A

INTERDEPENDENCE: In Interchange of Matter and Energy

Cognitive-Affective Scheme

Man is interdependent with his natural and physical environment.

The child just born cannot fend for itself. In effect, the infant, if it could embrace this major concept intellectually, would realize that at birth its very life depended on its close connection with a donor of the environment which gave it life -- the mother -- who, in effect -- nurtured the internal environment of the child. It is nonetheless true that the external environment now mothers the infant -- as well as it mothers us -- and conversely, we mother our environment by our acts -- whether social, political, economic; whether they come out of science or technology. Our interdependence is such that, in thesis, the organism is not organism outside of the environment which gives it life. The organism is fitted to an environment, and if the

environment is not fitted to the organism, malfunction and malstructure may result.

Thus, add sufficient DDT, or mercury, or cross the acceptable threshold of radiation and organisms die -- whether salmon, or man. Exceed the viable population in an area and the environment cannot support it -- whether lemming or Kaibab Deer. Overpopulate and the food supply cannot support life.

More finely-tuned organisms like man are interdependent with more than the physical environment which gives them physical well-being; -- their mental and emotional life conditions their health as well. Wise nutrition is not the only imperative of health; wise recreation, exercise, rest, the needs for privacy, initiative and variety are imperative as well. Interdependence (as a Cognitive-Affective scheme) then includes not only fitness of the physical environment, but fitness of

the social environment -- for man is interdependent with his total environment. He is interdependent with the environment which keeps him Homo Sapiens, and that which keeps him human and humane.

Supporting Concept

Level 1 <u>In any environment, living things have similar needs.*</u>

Examine any organism and its general requirements remain the same as others: food, water, and oxygen for energy, adequate temperature and light (especially for autotrophs; heterotrophs depend, of course, on the chemosynthesis of the autotrophs.)

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* It is exceedingly important to note that "Level" is not interchangeable with "Grade". Level indicates a level of maturity, of experience and understanding. It is entirely conceivable that in certain communities children in Grade 1 may be engaged in studies fitting a Level 2 concept; in others, children in Grade 4 may be engaged in experiences fitting study of a Level 2 concept. The segmentation of the concepts is for the sake of convenience, structured for those curriculum workers responsible for orchestration of the experiences pervasively throughout elementary schooling.

The concept requires at least a first probe into food and nutrition, and for man, adequate diet. Probes into the physical environment -- air, water, light are necessary. So, too, the requirements of shelter -- in a variety of habitats wilderness, domesticated (the farm and country), urban and suburban.

Recall, however, the children are probably in Kg -- or the first year. But they can begin their journey along the conceptual pathway of Interdependence.

Supporting Concept

Level 2 There are a variety of environments, each with characteristic features and life.

Study ocean, lake, pond, river, or stream; forest, wood, or park; mountain or valley; wetlands or desert -- hydrophytic,

mesophytic, or xerophytic environments. All have characteristic features; all have characteristic life -- or the absence of it.

Children -- wherever they are -- can have "experience" with all of them. The experience can be "direct" -- through field trip, or "indirect" through text, film, filmstrip, slide, TV. A Cousteau film into the marine environment, a **Park** Ranger's trek through Yosemite, a teacher's account of a summer vacation in the wilderness, the aquarium at home -- or the garden, or the patch of lawn -- all are grist for concept-seeking and value-seeking. First probes into geology -- the features of the environment; geography, climatology, and ecology per se are the hub of the concept. But recall the children are still very young; they can begin to appreciate our dependence on green plants, but most will not grasp photosynthesis, nor the lysis (breaking down decomposition) of water which is part of it.

Supporting Concept

Level 3 Life and environment interchange matter and energy.

Children probe into the variety of ways in which organisms utilize the environment, and in so doing modify it as they interchange matter and energy with the particular environment. Whether we view earthworms feeding in soil and adding to soil, whether oak growing in soil and dying adding to it, whether cattle grazing and adding feces and other wastes to the environment, examples abound for the taking. The simple inquiries -- whether purely discriptive or investigational -- children conduct furnish an evidential base. The seeds planted in pots placed in an environment in which light is absent compared with their controls -- carefully heated the same way, except for the presence of the variable light, give a first plausibility to the concept

that green plants depend on light. So, too, other variables -- minerals and the like; so, too, children can begin a fair analysis of the Van Helmont "error". (Recall he "concluded" that a willow twig, grown to a sizeable plant, had gotten its matter from water.)

Here too the farmer's need for replenishing the soil, and man's need for the farm -- as a source of matter and energy.

Supporting Concept

Level 4 Life converts matter and energy into characteristic species form.

There is the rare child who doesn't wonder how it is that the food he eats turns into more of him -- and this, no matter what he eats. Soon he notices that this is true of all living forms, and so he begins -- without knowing perhaps -- a probe into a major concept of life: Life is organized to convert matter and energy into characteristic structure. Investigation upon investigation supports this -- and so too preliminary investigations into the capture of sunlight by green plants. To understand the green plant as prime producer is basic to his understanding of the simplest ecosystem -- and the planetary ecosystem.

Further, the understanding of matter and energy as basic to the maintenance of life, furnishes a base of understanding of the

relation of population to food supply, of the importance of an agricultural technology to the wealth of nations. He begins to see the importance of farming, not only as basic to our country's economy, but the "green" as basic to the supply of oxygen.

He begins a first probe into the life of the plankton and its significance to the world. And he sees himself as interchanging matter and energy with the environment. And so another basis is developed for the child's understanding of his interdependence with his environment, hence his responsibility to it.

Supporting Concept

Level 5 <u>The environment is in continual change, in present and past ages.</u>

Evidence of change is around the child. An orange grove, a field, a woods disappears -- and in "their" place a village, town, or city. Day changes into night; the seasons change the environment in northern climate more than southern; but change is perceptible. TV furnishes additional evidence. But the more subtle changes require the guidance of the experienced mind -- the Teacher's.

The changes in soil; the browning of a stream; the silting of a lake; the burning of a lawn; the beginnings of smog; the death of vegetation; the meaning of geological evidence (faulting or diking); the evidence of a fossil. And then there is the pre-recorded history of the earth. Library research and reading is

not to be despised; scientists, social scientists, scholars do rely on authenticated accounts.

Does the community change? How? Where? When?

Evidence is plentiful -- all around the child.

Supporting Concept

Level 6 Man is the prime agent of change of the "natural" environment.

The Indians, the early settlers met, lived most nearly in harmony with the environment, but they too altered it -- if only to cut trees for canoes, or for firewood. But as man spread westward, and northward from Mexico, he began to exploit his "natural" environment. Forests were cleared to till the soil; beaver and fox were hunted for fur; buffalo were almost

exterminated; so was the otter.

Water was brought to irrigate, and soil and garbage for land fill. Wilderness was invaded. Now the air is fouled -- and is being made unfit. Lakes are drying. The oceans are becoming cisterns for our sewage -- our oil spills. Thor Heyerdahl, in his recent odyssey in the Ra, reports nodules of wastes over the ocean -- not just the shores.

Children now 11 and 12 years of age, have perhaps crossed the conceptual rubicon. Children can now appreciate the inter-relationship of Science, Social Science and the Humanities; the technology of the automobile can be related to the social value of owning one. And the beauty of the un-smogged environment can be compared with the deadly ugliness of the one fouled by the hosts of chemicals spewed into the air.

And the supply of oxygen by the phyto-plankton (estimated as producing 50% of the world's supply of O_2) can be balanced against its destruction by pesticides and wastes of industry (including mercury), and detergents as well. Further, children are now ready to probe the effects of biological magnification and eutrophication -- not necessarily blocked by the need to use these terms. The child's necessity is to communicate effectively his understandings, his needs, and his problems.

Conceptual Pathway B	INTERDEPENDENCE: In Social Interaction
Cognitive-Affective Scheme	Man's social behavior is basic to maintaining, altering, adapting, or destroying the environment.

What environments shall be conserved, how they shall be conserved, and who shall conserve them calls not only on the

concepts but also the values we bring to problems of Ekistics. Recall that values concern themselves with the objects, events and behaviors we prize. Without the intervention of man, the Trumpeter Swan might well disappear, as might the Gingko, or the Sequoia, but man's intervention could hasten their destruction, or contribute to their conservation.

It is man who cuts forests, who uses detergents, who pours DDT into Clear Lake, who preserves the Muir Woods, who adds to California the population of a city the size of San Diego, who has invented such "problems" as "population", "pollution", "pesticides", who has built up a formidable list of endangered species, who nevertheless preserves historic sites, and could -- if he would -- restore, replenish and redeem the environment. Whether man develops a policy of zero population growth (zpg) or not is a matter of values. The case of the "Saving of the

Bay" recounted on pages 14-44 is undoubtedly an explication of the values held by the community.

Values, such as these, reside in the area of the Social Sciences. This is not to say that the natural sciences are value-less. Truth, open-mindedness, humility, are values respected by scientists -- and part of their community of discourse.

Supporting Concept

Level 1 <u>Men live in different environments.</u>

Men do live in different environments -- and survive in them. Whether in the Sierras, or in the Kalahari, in the desert, or on the tundra, on the pampas, in jungle, or asphalt, by ocean-side, by lake, or river -- in urban or suburban environments -- men adapt, and adjust. Their cultural components -- for example

their art, religion, shelter, language, remain constant -- their cultural forms are different. Thus, their modes of shelter are different -- mud, thatch, cement, brick, wood. We study the geography of the globe -- and we find the great variety of the abodes of man. We find him adapting -- adjusting -- surviving.

Supporting Concept

Level 2 <u>Men develop different modes of adaptation to life in different environments.</u>

Clearly men have different customs in different environments. Their norms of behavior are different: The Navajo, the Seminole, the Nepalese; the California Indians developed different modes of adaptation from say those of the Northeast; the Eskimo has customs which even in these days are different from those of the

Alaskan, or the Californian or Minnesotan. Western man uses his environment differently from the Hindu, or African.

But over the world, man's cultural forms press on the environment -- the seal is in danger in Canada, even as another of the genus disappeared from the Falarons. Children can, and do enjoy probing, the various customs of other children over the globe. They learn that in all the diversity of human life, there is unity; cultural components are alike. The forms and norms which men prize are different.

Supporting Concept

Level 3 Men utilize the environment to secure their needs.

Citrus and cotton and wool and salmon and flowers and

grapes and wine and fruits of all kinds, and truck crops: all from California. Iron from Minnesota, sulphur from Louisiana, corn and wheat and oats from the Prairie States, timber from the Northwest, ore from California, Oklahoma, and Texas, fish from both coasts, beef from Texas and Argentina, rubber from Indonesia, tobacco and cotton, and rice and citrus and truck crops from the South. Manufactured foods from the North and South. Airplanes from the West. Automobiles from Michigan. Tin and copper and oil from South America. Uranium, wheat, fish, and fur from Canada.

Wherever man lives he mines the environment -- he mines the soil in agricultural products, he mines the earth for its metals and non-metals; he mines the air for its nitrogen; he mines the ocean for a variety of substances. Everywhere man grows food -- or hunts for it. The sophisticated activity of

the agronomists, and geneticists, who bred the high-yield rice hybrid IR-8 and the social scientists who assisted in introducing it into Viet-Nam and Indonesia is a highly civilized socially-oriented, technologically-competent hunt for food.

A child can probe the question: Where do I get what I need to live? He will find that, in general, he personally, produces little or nothing. He is interdependent with others for what he eats, what he wears, what he uses for work and play. And a child born in the United States will use 35 times or more the resources of children in other countries. In terms of resource use our population is not 200,000,000, but multiplied by a factor of 35. Or more.

Supporting Concept

Level 4 Men interact to utilize the world's available resources.

Men communicate with each other; men transport each other's goods; men exchange goods and services; men interact. Moreover, their interaction is global; goods are transported from the United States to Japan -- and returned. Ships, trains, and planes fly the commercial routes of the world. The "have not" nations depend on those who "have"; those who "have" food often feed those who do not. American wheat and rice and corn are found throughout the world -- often in charity and not in commerce.

The fact remains that the world's resources are not adequate to feed the projected population growth. Just as men are interdependent, so are nations. Most nations are "have-nots"

where adequate resources necessary to maintain modern life are required. So too the United States does not have all the resources it requires.

Supporting Concept

Level 5 Social aims determine the utilization of resources.

Cultures and societies vary in their utilization of resources. The California Indians from South to North did not utilize their environment the way the Spaniards did. The Massachusetts Indians did not utilize the resources available in their environment the way the Pilgrims and Puritans did.

The religious customs of Hindus forbid them from eating their cattle; Americans breed them for food. Social aims (social,

political, economic) determine whether wheat shall be hoarded, sold, or sent to a starving country. Whether or not a resource will be utilized depends on the technology of the nation (atomic energy) -- as well as its social aims; whether agricultural crops can be grown and harvested depends on a supply of labor; whether water will be brought to an area depends on the economic resources of a city, state, or nation.

Supporting Concept

Level 6 Man modifies the environment in order to utilize his resources -- and increase them.

From muscle power, to beast power, to H.P. (mechanical horsepower) man has increased the energy by which he utilizes his resources -- and increases them.

Clearly, to continue living the good life, man's appetite for his resources will increase. The need for food, and fiber, water, electricity, transportation, will increase -- as the population increases. And to increase his resources man attends to the education of his young.

Note, as man utilizes his resources, say biological (renewable) resources, he increases his use of pesticides and fertilizers. (Fertilizer washed into the waters hastens eutrophication -- the growth of algae, eventually of bacteria, eventually reducing the oxygen supply. Pesticides -- concentrated in increasing percentage as animals feed on each other -- result in a biological magnification which causes the death of the main predator in the food chain.)

To increase his supply of non-renewable resources -- oils, metals and non-metals (recycling is not yet an art) man is ever on the hunt over the globe. But now he is turning to a probe

of his non-exhaustible resources (relatively speaking) such as sunlight.

At this level children begin to synthesize their concept-seeking and value-seeking. They begin to consolidate their experience into a relatively mature awareness of the concepts and values underlying the utilization of renewable, non-renewable, and non-exhaustible resources. The child begins to focus on the role of human resources, advanced through education.

Conceptual Pathway C	INTERDEPENDENCE: In Cultural Components and Forms
Cognitive-Affective Scheme	Man utilizes his symbolic and oral traditions to maintain or alter the environment.

Within this area of understanding, the child probes the

bases for the appreciation of aesthetic beauty and order, as ennobling and productive. Moreover, the child begins to probe his own values, using prior experience in science, social science, and technology; the aim to develop an ethical construct of the environment. The conceptual area encompassed is that referred to as the Humanities -- but includes as modes of study and expression art, music, literature, drama, photography, dance, film -- all the "languages and modes of expression of man".

Somehow, and naturally, conservation became first the cognitive-affective domain of the naturalist, then scientist. Slowly we began to understand that the choices were not only those of "love of nature", but "love of life", particularly its quality. The phrase "quality of life" traverses the cognitive-affective domain of Ekistics, for it insists that the social scientist, whether economist, political scientist, or sociologist

and the artist -- whether painter, poet, musician, writer, dancer, or dramatist, evolve the basic behaviors necessary to the establishment of a culture which sustains a sanative environment -- one of beauty, and order -- an environment that permits the human and humane in us to prosper.

As children talk and tell stories, read and listen to stories, paint and evoke their symbols, write stories, or emote their feelings in role-play or just-play, as they sing,as they invent their tales and their poetry -- they build the environment.

They sing, do they not, "America the Beautiful". Isn't it time they learned to believe the symbols they hold so dear? Is America to remain "The Beautiful"?

Supporting Concept

Level 1 Men interact mentally and emotionally to the objects and events in their environment.

Within this area of understanding and activity, children probe the objects and events about them. Purpose: to develop insights into the nature of beauty and its expression. Basic questions to be asked might be:

Why do you like it?

Why don't you like it?

Why do you think it is beautiful?

Why do you think it is not beautiful?

Children paint. They sing. They talk, perhaps they babble. They recite poetry, jingles -- and their own "poetic" invention. They tell stories. They take walks. They see. They

envision. They can explain, in their own terms, why they like what they do. They can -- and do -- listen to other children's stories which are evocations of their personal tastes -- and styles.

What do they enjoy. Why?

What music do they like. Why?

Which paintings do they like. Why?

Which poems do they like. Why?

It is never too early to give children opportunity to develop a sense of beauty and style. And in all this the teacher's sense of beauty is important. What she does speaks so loudly, the children cannot hear what she says.

Supporting Concept

Level 2 Men seek out objects, events and behaviors symbolic of beauty.

Within this area of understanding and activity, children actively begin to select objects, events, behaviors, areas -- if you will -- symbolic of what they consider to have beauty.

Purpose: to begin early involvement in family and community efforts to support these elements of the environment which offer beauty, and to diminish those which do not.

Children can and do select "words" and "phrases" they like, they do select objects of clothing they like; they do select records they like -- and TV they like.

Through direct experience -- observations in the community, and vicarious experience -- observations of TV, they can select objects, events, behaviors they consider beautiful -- and those

they don't. The performance objectives selected at Level 1, are enhanced in Level 2. (See pages 205-206, Chapter III).

Supporting Concept

Level 3 Men, responding to special environments, create objects and events symbolic of their interaction.

Within this area of understanding and activity, children begin to increase their craftsmanship. By this time they should have gained some effectiveness in an area of craftsmanship -- however "ill-favored" but surely their own -- whether in an ability to grow plants, take care of animals, paint, sing, write, tell stories, act, sculpt, make models -- whatever mode of expression. Surely this is a beginning, but all efforts, however

inexpert are beginnings. But all children can begin to show proficiency in caring for their own environment, beginning with themselves.

Care in healthful appearance, care of room, of schoolroom, of school materials, of plants, of animals, of plants and animals in the neighborhood, of pictures in the room, in the halls. Care of resources -- electricity, water, and the like. All modes of craftsmanship are to be encouraged -- none despised. Recall the story of the Juggler before the Madonna; he had no other "offering" but his juggling.

Supporting Concept

Level 4 — Cultures are characterized by their special ways of reacting to the environment.

Within this area of understanding and activity, children probe a variety of cultures which have interacted with the environment. Purpose: to study effective and non-effective ways of response to the environment.

Whether one studies Periclean Greece or Renaissance Italy, Michelangelo, Van Gogh or Mondrian, Beethoven or Mahler or Copeland or Sibelius -- or whether one studies the responses of Pilgrim or Pennsylvania Dutch, of Mongol tribesman or Maori, of the settlers of Jamestown or the Spanish missionaries in San Diego or Los Angeles or San Francisco, or the varieties of responses of Americans from the time of Columbus, to Westward Movement, to the Western Pioneers, to Dumbarton Oaks -- one finds a response to the environment.

The natural environment was ravaged from the all-too-rapid utilization of forest and prairie; so too were man-made environments

hastily built -- the cities are growing into megalopolis, into connurbations of vast dimension. We hear "new" names -- a response to our rampant technology and concentrating population -- LaFran, Chic Pitt, Bowash. "Ghetto" takes on new meaning as does "urban slum".

Yet there is beauty around us. Who is responsible for the environment? The public? Government? (In California, almost half the land is federally owned.)

But recall the children are still young; they can -- and do -- however, probe at least two aspects:

a) How their special familiar communities care for the environment;

b) How "global" man -- as viewed on TV (and the news media), cares for his environment.

Supporting Concept

Level 5 Men create objects, events, and behaviors which satisfy their images of beauty, or order.

Within this area of understanding and activity, children study their environment to determine how their community creates events, behaviors which satisfy images of beauty or order.

Within the area of Concept Level 5, children examined a variety of cultures. On this concept level children study the historical growth of care of the environment within the United States.

Certain periods of history are also selected for study for purposes of comparison and contrast. Purpose: They probe the growth of population centers -- settlements, villages, towns, cities, megalopoli, connurbations -- they study the factors --

special goals and technology -- which made these possible. They study the efforts of conservationists to conserve wilderness and city. They begin to probe the ethics within the area of Ekistics.

Supporting Concept

Level 6 Men recreate the environment.

Within this area of understanding and activity children probe the present, and from the present, create images of the future. Purpose: To focus on their developing ethic of conservation.

Within the 6th level of experience at least two culminating and focusing activities are recommended:

-- a week of out-of-door experience (possibly in a school camp)

-- a series of field trips into the community.

This is not to say that out-of-door trips of all manner and variety -- from wilderness, to park, to camp, to supermarket, to garden, to city square and common, to historical sites, to museums, to out-door centers -- all manner and form of out-of-door educational activity should have been probed.

But, at this point of study, a concentrating and culminating experience may be possible. Of course, the teaching community (administration, curriculum, instruction, evaluation) may select another period of analysis and synthesis.

Children can develop an ethic. We have watched children in the silence amidst the silence and heard their talk and early they make their goals, desires and aspirations known. They grow.

Explications of A Conceptual Framework for Introductory Ekistics

-- for the Junior High School.

In the junior high school it is surely appropriate to press forward with the cognitive-affective probes developed in the elementary years but to stress particularly the Skills of Independence -- personal and individual inquiry into the environment. But Skills of Independence, as we shall see (Chapter III, Instruction) are based on the Skills of Interdependence -- the acquisition of information pioneered by others, namely by scientists and scholars. The junior high school student should have the opportunity to synthesize past experience. If indeed we do stand on the shoulders of others let us acknowledge it. Children should learn early that the intellectual environment, no less the natural or social one, also yields to interdependence.

We ignore facts and follies of the past at our grave peril. Must we be doomed to repeat error? Must history repeat past calamity?

In the junior high school most children can use the Skills of Interdependence more profitably; they can use books as antecedent to investigation side-by-side with investigation, or to check the findings they have gained through investigation. After all, all scholars seek confirmation; facts do not "exist" until they are confirmed. And, who knows, another child, another scholar, may have discovered the same phenomenon in a prior experience.

Suggested units embodying the foregoing are suggested in these units for the Junior High School.

Cognitive-Affective Scheme I — Societies perceive environmental issues of their time on the basis of past experience.

Within this area of understanding and activity, students probe the concepts and values held in past history, in past societies. Purpose: an initial probe into the origin of the problems affecting their society.

Was there a "pollution problem" in times past. Of course, water contaminated with wastes were vectors for the diseases of cholera and thyphoid, and the like. But our technology -- the discovery of germ causes of diseases, and the technological development underlying disease prevention and treatment -- surmounted these. And, of course, catalyzed another problem: growth of population.

Were there food shortages and famines in the past. Of

course, but our technology -- coming out of agronomy, soil science, genetics -- surmounted these, at least in Western societies. Again, the conquest of shortages, catalyzed the growth of population.

When did the city begin to "explode"?

When did smog begin to appear?

When did wilderness begin to disappear?

When did we begin to "worry" about our resources?

1,000,000,000 people in 1830, 1,000,000,000 more in 75 years, 1,000,000,000 more in 35 years, etc.? Will this continue? Or can technology overcome population pressure? The content of this unit is primarily historical.

Cognitive-Affective Scheme II — The interaction of the culture with available technology determines the nature of the environment which is planned and developed.

Within this area of understanding and activity, boys and girls probe the relation of the kind of environment which is related to particular cultures. Purpose: to assess the aims of their culture in relation to the environment.

What kind of environment sustained ancient man? Here students can probe the relation of environment to style of life. When did man, as food gatherer, give way to man as grower? What kind of society was possible when man had the technology to assure a food supply during hazardous time -- when he conquered climate and disaster (such as famine)?

What kind of environment did American, South American,

Arctic Mongoloid peoples build? Did American Indians live in harmony with their environment? Did they take on any adaptations of the settlers and pioneers? Why?

What happens when a culture possessing an advanced technology meets a culture without it (e.g., the Dutch-English in South Africa? Or the Spaniard in Southern California and Mexico?).

Are we adapting to the growth of our technology? For example, can we adapt to the following:

-- crowding in cities

-- crowding of highways

-- noise "pollution", and the like?

Recall, however, these are boys and girls of 13-14-15 years. The depth of the probe should, of course, be related to prior experience, and capacity. Nevertheless, at these ages,

with TV presenting glaring examples of the impact of technology on society, boys and girls can probe these questions -- if final solutions are not required and imposed.

Cognitive-Affective Scheme III — Social issues and decisions alter the environment. (Emphasis on group, that is, social decisions.)

Within the area of understanding and activity, boys and girls probe certain of the social decisions which alter the environment. One can begin to probe almost anywhere in this domain: Is a parking place to take the place of a park? The group should plan action -- if action is desired.

Why do some families build gardens -- others basketball

courts? Why do some apartment dwellers have flourishing window boxes of flowering plants?

Why do some families prefer country living -- others city living? Why do some buy a camper -- others a sports car?

Or one may probe problems encompassing larger areas. Such as:

-- Why do some towns or cities encourage the influx of industry -- others have zoning laws that are restrictive or prohibitive?

-- Why do some community groups -- in ghetto, or suburb -- participate in a "watch over the environment", while others do not?

Cognitive-Affective Scheme IV — Social issues and decisions determine the utilization of all resources. (Emphasis on political decisions involving government and legislative action.)

Within this area of understanding and activity, boys and girls continue the probe begun within the area of cognitive-affective scheme III. But the purpose is different: to begin an initial probe into political decisions as they alter the utilization of renewable, non-renewable and non-exhaustible, as well as human resources. (Of course, prior experience in the elementary schools conditions the depth of the probe.)

The probe can begin with issues and decisions arising out of individual and family experience (to emphasize economic factors.)

Why are objects purchased? What are the values determining

the recognition of the issue or decision? For example, why do some boys and girls purchase a package of seeds; others a ticket to the movies (assuming there is not enough for both)?

-- What are the decisions behind family decisions on clothing, on vacations, on outings, on amusement? Why do some go camping? Others not?

-- Where does a city get money for school, for parks, for tree planting?

-- Where does a city get money for slum clearance?

-- Who makes the decisions, who does the planning on the utilization of municipal funds?

-- Is there a City Planning Commission? Why? Why not?

-- Is there a Conservation Commission in the city? Why? Why not?

-- Who decides on the expenditure of municipal funds?

Does a citizen have any part in the decision? How? When?

The emphasis in the junior high school is clearly that of encouraging the student to probe on his own. There is evidence which points to the junior high school years as years of initial career decision. Most decisions on future vocation are often made before the age of 15 -- in terms of kinds of work to be pursued in the high school. The kind of work done -- and its manner -- often conditions the posture towards full utilization of the potential of boys and girls -- with their special idiosyncratic gifts, opportunities and destinations.

A Conceptual Framework for Ekistics

A Course for the High School

It is time all young men and women were offered a course in Ekistics. Clearly, the concepts and values which make up the domain of the course are now eminently part of life; their impact on thought and action is demonstrable.

The term "course" implies daily concentration; nevertheless, with the modular "courses" (mini-courses) now part of many high schools, the course may be part of a quarter, trimester, semester, or year. Or in non-graded instruction it may have a time-sequence which is based on the application of the students.

Ekistics is more than a laboratory or field course; the entire community is the field of study (See Instruction Chapter III). Furthermore, it is truly concerned with problems that are

part of modern life, whether personal, family, community, city, state, or nation.

Cognitive-Affective Scheme 1 In any given environment, organisms are linked within an ecosystem.

Within this area of understanding and activity, students probe the delicate interrelationships of organisms in their environment. Purpose: to determine the kind of dynamic balance in which organisms exist and how easily it is upset.

From aquarium to pond, from sea to ocean, in wood and forest, in a decaying tree trunk -- organisms can be seen to survive with an ecosystem. The ecosystem consists, in essence, of all the physical and biological conditions which are supportive

of organisms living interdependently. An ecosystem can be as large as the world if we consider man as interdependent with his resources over the globe.

In the field, students study the delicate but dynamic balance in which an ecosystem maintains itself entire; a pesticide, by affecting essential food organisms in a particular niche may destroy the entire ecosystem. Thus DDT in traces per million in plankton can be concentrated in successive food organisms in a food-web: (algae → copepods and shrimp → small fish → larger fish → largest fish) and the predator at the end of the link may suffer the effects of 200-500 parts per million. So DDT kills Coho salmon; and fish-eating birds. So DDT in mother's milk. Students thus become aware of biological magnification.

Similarly, eutrophication destroys ecosystems by a massive over-nutrition. The student probes his own inter-dependency within his own ecosystem: his dependency on photo-synthesis, on the oxygen produced by the ocean's plankton (more than 50% of the world's supply).

Further he studies man's dependence on his renewable resources: farming, forestry, fisheries. He ponders the meaning of the increase in the greenhouse effect, and of the population in relation to the food supply.

He learns that the environment available to organisms is limited; further for any species, the organism is adapted to a special environment and serves a particular ecological niche. And that in all probability, no two species occupy the same ecological niche. He begins to learn why man -- of all organisms -- is an unreliable dominant in the world ecosystem.

He has now begun -- on the basis of his experience in Ekistics (in the elementary and junior high school), to synthesize a system of concepts and values with which he can probe his environment with intelligence and compassion.

Cognitive-Affective Scheme II — Issues and decisions affecting the world ecosystem reflect the pressure of population upon resources.

With a basic understanding of man's interrelationship with other organisms we can proceed to probe what causes imbalance. Within this area of understanding and action, students probe the effects of an increasing population upon the environment.

Purpose: to develop for themselves an insight into the nature

of the problem. Barring disaster, there will be 4,000,000,000 people on earth by 1975. If the rate of growth existing today persists, then there would be a doubling of the population in another 35 years.

More than four centuries have passed since Cabrillo's ships came upon San Diego, and those of Columbus off Guanhani, 500 years or so ago. And now as we have said, each year California adds a population the size of San Diego. The Yokan-speaking Indian has disappeared. So too the free-living Tribes following them, the result of waves of settlers, motivated by visions of the better life. California is but a magnificent example. What affects California affects the world.

To understand the nature of population pressure, the student probes the way populations change sizes (population dynamics); he probes demographic data (birth and death rates). He

begins to understand the dynamics which underlie "rate of natural increase". He compares the "annual increase" of .77% for the United States against a world increase of 2% (20 persons per 1,000 per year). At this rate the world population would double in 35 years. How does one decrease the population? Or can all be fed and housed? Can the quality of life remain favorable?

He begins to correlate improvements in the technology of health (victory over microbes), and nutrition (the triumph of agriculture), to the increase in population. So too the effects of the industrial revolution on emigration and immigration. He analyzes the effects of urbanization and distribution of population. He compares population growths in underdeveloped countries with those of developed countries. He studies projected changes in density, and distribution. He probes the relationship

of the limits of population as related to the limited resources of the earth. For example, such questions:

-- Will there be enough food, enough space?

-- Are we likely to run out of metals before we run out of food?

-- Are we to run out of clear streams, pure air, and the beauty of nature while we still have food -- the "essentials" of life?

They ask the questions all educated men and women must ask:

-- What kind of a world do we want for life and living? For ourselves -- and our children -- and our children's children?

Even if we control the population <u>there will be children</u>.

Cognitive-Affective Scheme III Wise utilization of the environment is dependent on the organization of shortage.

On the base of prior experience in concept-seeking and value-seeking in the elementary and junior high school and the preceding probes in Ekistics, students should now be able to understand the meaning of shortage.

Within this area of understanding and action, students explore the limits of the earth's environment to furnish the resources for modern and future life and living. They probe the earth as their storehouse.

They probe the nature of fossil fuel, of hydroelectric power, of atomic energy, of solar energy as sources of energy. They probe the possibility of geothermal power -- and tidal power. They become aware of the earth's limits of energy-

supply.

So too they probe the earth's mineral resources; if for the next 30 years the developed countries will do fairly well, what of the next hundred. And what of underdeveloped countries, the present "have-nots".

They probe the uneven distribution of the world's mineral resources -- coal, oil, copper, iron, zinc and phosphate and of the so-called "mineral vitamins", for example, molybdenum, tungsten. They learn that the U.S. is a have-not nation in these important metals without which our technology would not survive.

-- What of potable water?

-- What of a balanced diet?

-- What of space?

As the student probes man's dependence on his renewable, non-renewable, and so-called inexhaustible resources, he comes upon the central question:

-- Can we plan to organize our shortages for the highest quality of life?

-- And if we plan, does planning reduce our freedom to act as individuals?

-- What does <u>wise utilization</u> mean?

Cognitive-Affective Scheme IV. <u>The concepts and values man accepts as guides to his future behavior determines the quality of his life, if not his survival.</u>

The student now engages in probing his own concepts and

values with regard to the environment.

Within this area of understanding and action the student probes the concepts and values which are basic to the development of a sanative environment. He probes Rene Dubos statements that "quiet, privacy, independence, initiative, and open space are real biological necessities, not frills or luxuries". He probes the concepts and values required to maintain and sustain the diversities which support the "spiritual potentialities of mankind".

He probes such questions as:

-- Can we have "pure" air and high industrial activity?

-- Do we require a resources policy?

-- Do we require a population policy?

-- Do we require an Environmental Bill of Rights?

-- How shall we secure an environment fit for life and

living?

-- What economic policy must we pursue?

-- What social policy?

-- What political policy?

He learns, alas, that while there is consensus on our need for policy and some agreement on the policy, there is lack of consensus about how the policy is to be carried out.

He is on the road to a resolution of conflict -- because he is facing the roots of the conflict. He probes the difference between value systems: Can each American utilize 35% of the world's resources? Should he? Should America feed the famine-struck nations? Can they? Questions like these.

He begins to at last understand the meaning of Adlai Stevenson's eloquent statement:

"We travel together, passengers on a little spaceship, dependent on its vulnerable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work and I will say the love we give our fragile craft. We cannot maintain it half fortunate, half miserable, half confident, half despairing, half slave to the ancient enemies of man, half free in liberation of resources undreamed of until this day. No craft, no crew can travel safely with such vast contradictions. On their resolution depends the survival of us all."

Chapter III

Instruction and Teaching

Instructed Learning, and Experience In Search of Meaning

Daily, children, and the growing young, come to teachers.

When valid research on instruction is available, teachers are bound by it. But research or not, teachers must teach -- and thus, style and method of teaching are personal inventions.

Our present mode is to speak of teaching through inquiry, and sometimes of learning as synonymous with inquiry; sometimes we speak of "processes of inquiry".

John Stuart Mill, in his System of Logic, spoke of

"Four Methods of Experimental Enquiry" (italics ours). To speak of inquiry as monolithic is to do injustice to the many kinds of inquiry that exist.

Schwab*, probing into "process", cautions thus: "Enquiry is far from being a universal logic. On the contrary, it is only a generic envelope for a plurality of concrete enquiries (italics ours). Each one arises in relation to a specific subject matter and the essence of each lies in its own substantive conceptions, its own data, and its own questions asked and answered". So Theophrastus, in the fourth century, wrote his Enquiry into Plants (On the Causes of Plants). We should speak

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* Schwab, Joseph J. and Brandwein, P.F., The Teaching of Science, (Harvard University Press, Cambridge, Massachusetts) (Combining the Ingles and Burton Lectures)

appropriately of an "inquiry into", not of teaching through inquiry. Enquiries are concrete; we inquire into something.

Those of us who teach require a theory of teaching which will embrace ever new terminologies -- whether inquiry, or process, or discovery. It seems clear that observations of what happens in a school are confused with what happens when children learn; actually what is being observed is what children are learning when they are taught.

But learning per se is greater than schooling, and education greater than teaching. One is not limited in learning to what happens in school. For school is given over -- in the main -- to instructed learning. Instructed learning is critically different from learning per se in both strategy and tactics.

A Strategy For Instructed Learning

A strategy developed for instructed learning is based on these premises:

1) Instructed learning involves not only learning but instruction, hence instructed learning.* Instruction involves teachers as well as students.

2) Instructed learning is based on non-randomized experience, that is, selected experience -- often segmental experience. This is to be compared and contrasted with learning based on random experience; often this is the kind of learning based on individual experience outside of school. It is not usually related to teaching -- but may well be.

3) Instructed learning implies curriculum and instruction, as well as materials of instruction, as well as a formal evaluation of success in instruction.

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* Jerome Bruner's term

4) Instructed learning implies not only non-randomized experience, but experience in search of meaning, or structure.

5) Instructed learning implies, certainly for the teacher, a plan of instruction, namely a curriculum. Here, we have developed a curriculum based on structures, or constructs commonly called concepts. The web of concepts within their conceptual pathways, constitute the structure of a curriculum we have called Ekistics.

A note on tactics

Once a curriculum undergirding instructed learning in Ekistics is developed (we have undertaken one such development here) the tactics of instruction can be developed. Bruner* again emphasizes that "insofar as possible, a method of instruction

*Process of Education. Cambridge: Harvard University Press, 1960. On Knowing-Essays for the Left Hand. Cambridge: Harvard University Press, 1962. Toward a Theory of Instruction. Cambridge: Belknap Press, 1966.

should have the objective of leading the child to discover for himself". But it is sheer nonsense to assume that this means that the child should discover <u>everything</u> for himself. Expertness in teaching has its constraints; above all an expert shows restraint. Bruner, having made the statement above, also issues this disclaimer; thus Bruner on "Discovery":

> "I find the topic of the conference a little bit puzzling. I am not quite sure I understand anymore what discovery is and I don't think it matters very much. But a few things can be said about how people can be helped to discover things for themselves.
>
> A word of caution first. You cannot consider education without taking into account how a culture gets passed on. It seems to me highly unlikely that given the centrality of culture in man's adaptation to his environment -- the fact that culture serves him the same way as changes in morphology served earlier in the evolutionary scale -- that is, biologically speaking, one would expect each organism to rediscover the totality of its culture -- this would seem most unlikely. Moreover, it seems equally unlikely, given the nature of man's dependency as a creature, that this long period of dependency characteristic of our species was designed entirely for the most inefficient technique possible for regaining what has been gathered over a long period of time, i.e., discovery."*

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* Bruner, Jerome S., "Part III, The Curriculum, Some Elements of Discovery", pp. 101-102; in: <u>Learning By Discovery: A Critical Appraisal</u>, Shulman and Keislar. (Rand McNally),1966.

Nevertheless, insofar as possible, the strategy and tactics of Ekistics is to furnish opportunity for the learner to "uncover" as well as "discover" structure for himself.

Curriculum and Instruction: The Marriage of Concept and Process

A theory of teaching which powers our quest for a suitable form of instruction for Ekistics may be stated as follows:

> "In any specified act of teaching, a new environment is created; in responding to the changed environment a learner gains capacities not achieved through prior experience but specified in the aims of the act of teaching."*

Instruction is concerned with creating a new environment for the child, to which he responds -- that is, he acts. This response helps us determine what cognitive-affective frame of

* Paul F. Brandwein: Notes Towards A General Theory of Teaching. Harcourt, Brace & World, 1966.

reference he brings to the act of learning, enables us to revise our tactics if we have exceeded, or underestimated, the prior experience of the child; enables us to validate whether a change in behavior has been achieved, enables us to create future environments which result in all those activities we call growth.

In our schooling, we have often treated children as babies -- yet they are indeed children. A child who draws a mouse thus:

is <u>not an artist</u>. He is expressing himself in line and form, not in words. No more than a child who investigates, using the modes of science, is a scientist. No more than a child who observes a bird on a branch is an ornithologist, or a child

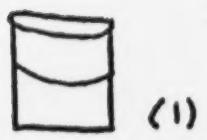
studying his environment, is an ecologist -- or ekistician. He is a child -- learning. He may become a scientist, or an artist, or a carpenter, or a baseball player -- or a teacher. Let him grow, and mercifully, let him become what he can in the fulfillment of his powers.

But it is clear that as teachers we are required to afford the child an opportunity to fulfill his powers in pursuit of excellence. (A definition of education perhaps).

A child is not endangered by early probes in concept-seeking. Thus, children who have experience with the concepts of "interdependence" in the first, second and third conceptual levels of schooling come early and more easily to an understanding of the effect of pollution on independence. One does not, indeed one should not, wait till children are mature to afford them experience. Of course this experience must not endanger them

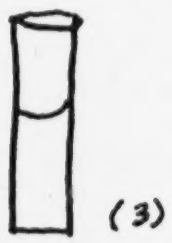
physically or emotionally.

Further, the mode of instruction (as part of instructed learning) is significant in concept-attainment. If the children are permitted first to probe, to do, then they will more easily undo their prior concepts, their prior insights. For example, take a concept which we all accept out of experience -- scientific training or no. We expect a glass tumbler of water to maintain its essential volume (its matter, as well as its mass) if we pour it into different containers.



Glass Tumbler

Flat Container



Tall Container

Yet, Piaget's children "thought" (verbally expressed) their concept that container (3) had "more" in it than container (1). The writer has repeated Piaget's investigations and confirmed them.

But IF instruction is included as part of the investigation, the results are different. For example, we have set up the following teaching environment as part of the kind of instructed learning which is now in mode. Recall that synonyms for instructed learning are: "taught", "instructed", "offered children opportunity to experience", "children have been exposed to this learning experience"; children "inquire into".

Suppose children both observe and experience (engage in concept-seeking) as follows:

A child (6 years of age) is given a glass-marking pencil and asked to mark the top of the liquid in the wide container.

He is then asked to pour the liquid into the taller container and to mark the top of the liquid. The child is then asked to pour the liquid back into the wider container and discovers that the liquid goes up to the original mark. Now, when asked, "If you were to pour the liquid into the tall jar, would there be more, less, or the same?", children generally respond, "The same". They cite the observation that the liquid goes up to the mark they made.*

In other words, the concept is associated with a "significant operation". In Bridgman's terms, the concept has become "synonymous with the corresponding operation." In other words, if children are given opportunity to become apprentices in investigation, to gain experience in search of meaning, they will gain the legacy of cumulative knowledge and a way of gaining new knowledge. For the unknown is sought best by those who have

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* Investigations published

experience with the known. The child -- guided by the teacher -- has time to develop, without being penalized for error. For learning consists in the amelioration and circumvention of error; learning is an art of intelligent failure, that is, as one learns, one reduces error; as one learns, one grows.

Given these experiences without hurry, with freedom to err, with freedom to try again, without an atmosphere of coercion of threat, we have found that children in the first grade -- in general -- are <u>not</u> confused by the variety of containers. They are able to state that the "water does not chaage, it is the same in amount," or "there ain't more," or "you didn't change anything but the glasses" -- and the like. They have <u>begun</u>, as it were, to move along a conceptual pathway. If you will, they have begun to form a "thought-system" or a "system of cell-assemblies" (the neurologist's term), or perhaps we may just say they have formed a "concept-seed". (We await the day when we gain a concept of

how the brain works, and begin to use accurate language).

This is not to say that all children are able to apply their "concept-seed" to the concept: Matter is conserved; (or if you wish: In a physical change, the amount of matter is constant).

In our experience, if the style of instruction is to give the child opportunity for doing (guided and unguided), rather than give him opportunity for listening and watching, then the child rapidly gains in concept-seeking and concept-forming. Doing also means reading, listening at appropriate moments, questioning; it means using all the materials of instruction -- from text, to laboratory, to audio-visual aid, to field, to appropriate human resources -- including the teacher. It means the child -- himself -- furnishes the energy for doing; the teacher refrains from telling.

Thus in the investigation above -- if experience were

progressively enlarged -- children would be able to apply the insight gained on the basis of their experience as briefly described on page 160, to a variety of liquids, to a variety of solids, and to a variety of objects. Of course, this in conjunction with their vicarious experience gained through TV. For example, at level 3 -- assuming increasing experience at each level -- children could visualize (an iconic-symbolic act, if you will), and <u>state</u> (verbal-symbolic act) that:

-- A ball of clay made into a small statue would not gain or lose weight;

-- Nor would a ball of clay gain in matter, or weight, if it were made into spaghetti-like form, or marbles, or cubes like sugar.

-- Further, a sink of water transferred to a bathtub, would be "flatter" but would not be "less"; a bathtub of water transferred to a sink would overflow but

would not "be more".

We wonder how close the greater facility in linguistic and semantic usage goes side by side with concept-seeking, concept-seeding, concept-forming.

All this may seem to be a roundabout, even unnecessary way of pressing the obvious: The richer, the more varied, the early experience of children as they search for meaning, the sooner will they cross the conceptual rubicon. But experience in search of meaning means, in turn, a curriculum organized to reinforce children's prior concept-seeking to reward it -- to build upon it. A teacher in the later grades (unfortunately called upper grades) not only inherits a child that is older in years; she should -- if the intellectual environment of the school (its curriculum) is structured -- inherit children further along the conceptual pathway. And if each child is considered of supreme

moral worth, that is, if the school environment is also one of constructive affection, then the child will in time be readier to cross the conceptual rubicon. Suddenly, when he has crossed it, it is as if the world has become clearer. Our investigations associate this crossing of the conceptual rubicon with the period of the third level -- about 8-9 years of age. BUT this depends on the child's prior experience along a conceptual pathway.

For example, in any investigation, a child (given the crude approximation of age-maturity and socio-economic comparison) who has the <u>random</u> experiences associated with a topical curriculum, does not seem to be able to cross the conceptual rubicon at the same time as a child who has an environment of non-randomized, concept-seeking activity -- always assuming experience which is not confined to the curriculum per se, but utilizes the total environment of the child -- an environment of experience.

We would insist however that there is no level of performance which is per se correct, or right; the converse is that the child communicating is neither right nor wrong; he is developing. As he gains experience and knowledge, and the insight based on continued concept-seeking and value-seeking, he is able to make better "guesses" or, if you will, he is able to "intuit". But as Bruner suggests:

> "The good intuiter may have been born with something special, but his effectiveness rests upon a solid knowledge of the subject, a familiarity that gives intuition something to work with ..... emphasis upon the structure or connectedness of knowledge increases facility in intuitive thinking."*

These "poor fits" are tentatively tried on for size -- and childhood consists of the years when these "poor fits", these "tentative concepts", are tried on for size. The "trying on for size" of childhood requires support -- even encouragement by the parent-as-teacher and the teacher-as-parent. But it also requires experience in concept-seeking and value-seeking.

We have long known that a painter learns to paint by

* Bruner, Jerome E. The Process of Education (Cambridge: Harvard University Press, 1960), pp. 56-57.

painting; and by instruction as well. A pianist learns to perform by playing the piano; and by instruction as well. A scientist learns to investigate, to inquire by investigation; and by instruction as well. He learns to consolidate -- and pioneer. An ekistician probes the environment and in so probing builds his discipline.

The purpose of instruction is to facilitate learning and simplistically we must emphasize that it is the child who is the learner. It is he who must do -- and undo. Nevertheless, in instructed learning, it is a teacher -- or group of teachers -- or a curriculum which creates the environment for learning. And it is a sanative environment for the kind of learning we seek. Further, it is only through the learner's activity that we know he is learning.

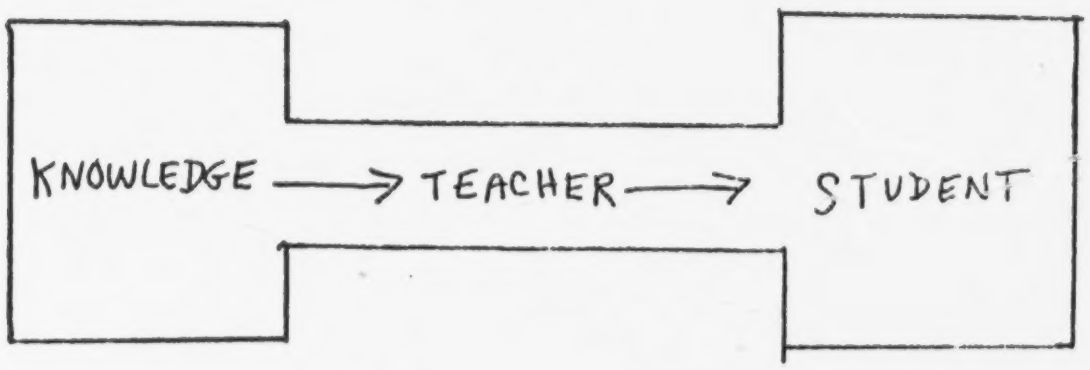
A mute learner, a totally inactive member of the class

may be learning, but we do not know that learning is taking place. To repeat:

In any act of teaching, a teacher creates a new environment out of elements of common experience; in responding to the changed environment, or in creating a modified environment of his own, the learner gains capacities not developed as a result of prior experience, or teaching.

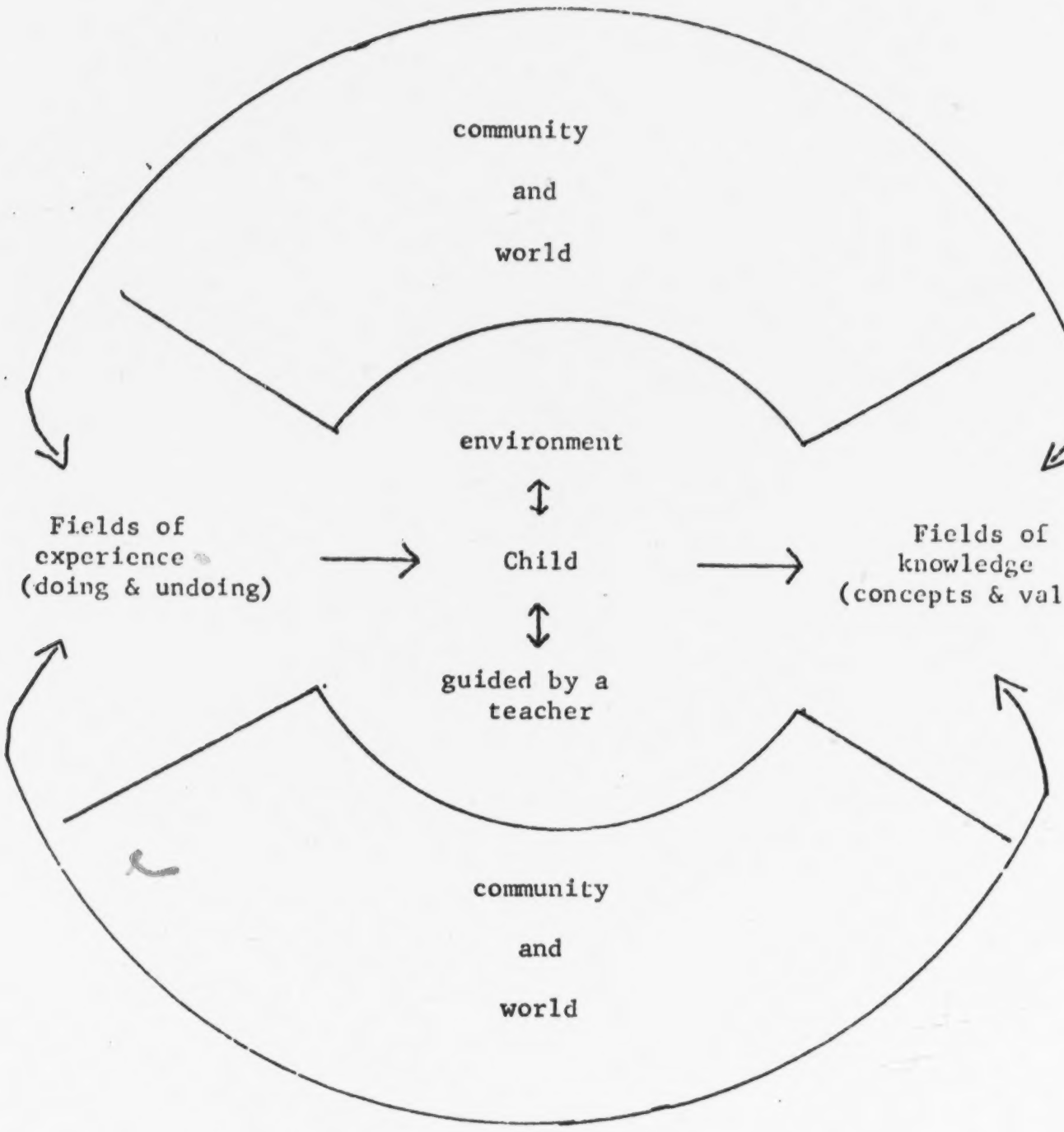
The theory generates a number of hypotheses which are obvious; further they can be tested by appropriate research. After all a theory is nothing more, nor less, than an explanation of current data and experience. But the theory offers a clear choice between two current modes of instruction -- in all areas -- but particularly in the Humanities.

In its simplest context, one "model" of instruction may be diagrammed as follows:



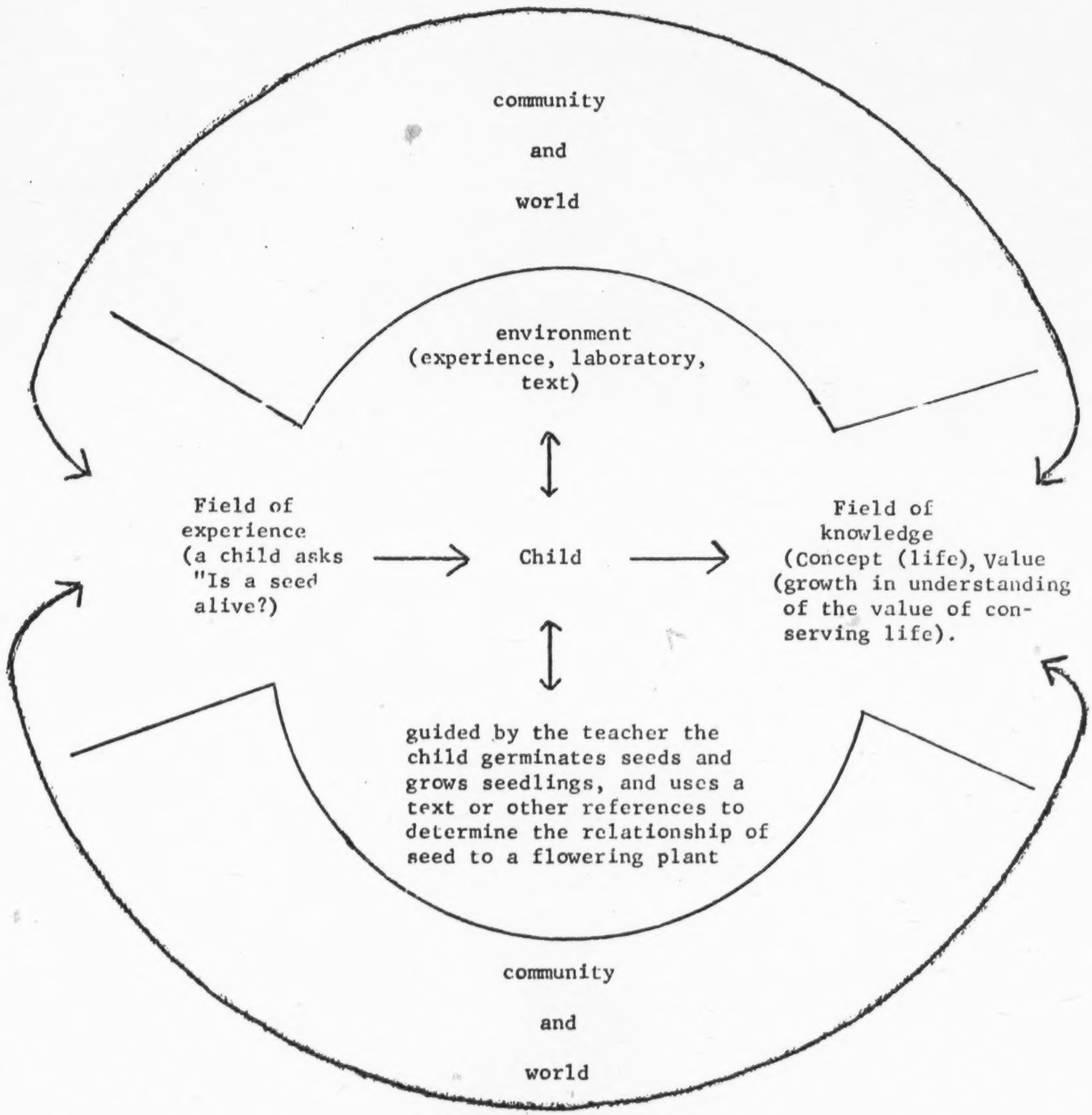
In this model, the "teacher" is a <u>conveyor.</u> As conveyor, the teacher presents, the students accept; they absorb; they memorize; at examination time, they return what they have absorbed from the presentation (lecture, if you will), or whatever aids, books mainly, they have used.

For our purposes, another mode of instruction seems expressly useful. It is not a closed <u>device</u> but an open system; a system which uses all the resources of the community, and in turn, the full variety of gifts of the pupils.



Experience feeds knowledge and knowledge feeds experience; known feeds unknown; unknown catalyzes knowing; the cycle is continuous. The teacher is guide, not presenter or guardian of the archives.

For example, a text may be used creatively as a "field of experience" -- within the context of our model, thus:



Nevertheless, it is of the utmost significance to emphasize two aspects of instruction which seem to have been ignored by those of us who have pressed for doing by the child (as we have here) and by those who have stressed "inquiry approaches". It is our view, supported by extensive work, that discovery does not proceed "in a flash"; the "flash of insight" is based on prior knowledge. We quote, therefore, in full context two students of learning -- Gagné and Pribram. Our observation of the pragmatic aspects of constructed learning supports their view completely.

> "Obviously, strategies are important for problem solving, regardless of the content of the problem. The suggestion from some writings is that they are of overriding importance as a goal of education. After all, should not formal instruction in the school have the aim of teaching the student "how to think"? If strategies were deliberately taught, would not this produce people who could then bring to bear superior problem-solving capabilities to any new situation? Although no one would disagree with the aims expressed, it is exceedingly doubtful that they can be brought

about by teaching students "strategies" or "styles" of thinking. Even if these could be taught (and it is possible that they could), they would not provide the individual with the basic firmament of thought, which is subject-matter knowledge. Knowing a set of strategies is not all that is required for thinking; it is not even a substantial part of what is needed. To be an effective problem solver, the individual must somehow have acquired masses of structurally organized knowledge. Such knowledge is made up of content principles, not heuristic ones."* (serving T. guide, but cannot be proved)

And further, to quote Pribram:

> ".....there is little merit in the accusation that because of their routine character, teaching aids (programs) fail to meet the most urgent requirement of education: to produce creative people. We harbor many misconceptions about creativity. According to the most prevalent misconception, discoveries and inventions arise out of the blue. But the contrary is the case. In reality, discoverers make their discoveries through what they already know: they match the unfamiliar against a thoroughly incorporated body of fact. Columbus, for example, knew a great deal about navigation. He knew the assumed boundaries of the flat world and what could be expected if, as some people suspected, the world were really round. But other explorers had to repeat Columbus' feat before the discovery of America was admitted (should we say as context?) to the thinking of all sailors.
>
> The inventor achieves novelty within the bounds of certainty. He comes upon, finds, only when properly prepared for the finding.

* Gagné, Robert M., The Conditions of Learning, Holt Rhinehart and Winston, New York (1965), p. 170.

The term "inventor" derives from the same root as "inventory." Edison expended his "ninety-nine percent perspiration" by taking stock of the boundaries of known electrical science. Only then, at those boundaries, did the new procedures strike him as plausible. The inventor innovates, as when, like Edison, he substitutes tungsten for iron to make an electric light bulb from an electric heating element.

The construction of a great symphony follows familiar lines: the rules of theme and subthemes, beat and counterpoint, form and movement, must all be thoroughly mastered before creative composition can begin. Beethoven created music by taking discipline even farther than its already complex structured limits. He sensed nuances where none had been sensed before. He prepared musical programs more complicated than seemed possible.

And what of the poet, supposedly the freest of free souls? Perhaps more than any creator, he is constrained by the known rules within which novelty can be expressed. Shall he choose iambic pentameter, rhyme or alliteration, couplet or sonnet? He must carefully tend the meaning of a word so that where several meanings are possible each is enhanced by the context in which the word appears. In such a wealth of rules and orderliness lies the creativity of the poet as well as his freedom. For freedom is not anarchy. Real freedom is intelligent, knowledgeable choice and rises out of order when order achieves sufficient complexity.

Thus, man's brain shapes freedom. Through ever more effective innovations in the rules for social interaction, man's brain frees him from fear. Through ever improving methods of production and distribution, man's brain frees him for love and fun.

Man's brain does all this and always has. We share the promise that it always will: though slowly and by steps with pain. For that is how we learn."*

* Pribram, Karl H., "Neurological Notes On Educating", Theories Of Learning And Instruction, The National Society For the Study of Education, Chicago, Illinois, 1964.

The "educational system" we have diagrammed is a paltry thing; the actuality has much more promise. It exists -- in many school systems -- in many manners, and forms. It has existed for many years in most kindergartens and most graduate schools within the university. Less than two years ago it existed in large part in most primary grades, less so in intermediate grades, less so in junior high schools, less so in high schools, least in colleges.* But over the nation, the modes of instruction are opening; more and more instruction is turning from the system of conveying the archives to the child, to a system where the child conveys his powers to the ardent pursuit of his various excellences. Ardent is the word; the teacher motivates what is ardent in the individual child. And the school is beginning to know that there are varieties of excellence, and these varieties of excellence -- embodied in a variety of children -- have a

* We have observed school systems in the United States which use non-graded systems to give the child full opportunity, but we are not speaking of non-graded systems per se. All school systems can make use of what is already known to develop a system where the child can fulfill his individual powers in pursuit of his excellences.

place in an open society.

In such a system, a child can and should learn in all ways, by voice, by book, by machine, by investigation, but above all, by example. A teacher cannot be replaced, a lecturer can. A machine can do as well as most lecturers. Of course, the brilliant lecturer conveys not mainly his subject, but himself; he conveys his life.

Nevertheless, a teacher is larger than life, for he encompasses the lives of children. Education remains the single voyage of the child; it is synonymous with growth.

In reflecting on the modes of instruction we have been answering in part the all-important question we posed:

"What kind of a world do we want to live in?"

But in counterpoint the question is also:

"What kind of a world do we want for children?"

In effect, man has survived because he has been able ever and ever to build a better world for his children. In spite of the absurdities and contradictions of life, man has retained this franchise of humanity. Thus, he has survived uncounted plague, devastation, famine, war. Thus, too, he will redeem the environment.

Ekistical Performance:

Encouraging Change in Behavior

We have stated a concept of instruction* -- no, of teaching -- which expresses a position held by <u>all</u> theorists and practitioners of the Teaching art: namely, a learner's "learning" is <u>known</u>, <u>his response</u>, that is -- <u>by his behavior</u>. We have postulated -- in effect -- that the teacher does not know he is teaching unless he does get some <u>response</u> by the student. Nevertheless, if this response demonstrates a change in behavior, we as teachers, enjoy a justifiable satisfaction for <u>producing a change in behavior is synonymous with education</u>. In Ekistics, the aim is to produce those changes in human concepts and values which result in behavior which demonstrates:

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* See <u>Theory of Instruction</u>, Ibid p. 155.

a) recognition in word and deed (note deed) by the student that he is interdependent with his environment;

b) behavior which demonstrates practice -- by word and deed (note deed) that the student supports a culture which sustains a sanative environment.

We should then proceed to develop a plan in a lesson-cluster which explicates Teaching theory; namely, one which is centered on response by the learner, and encourages a change in behavior. We are aware that many creative teachers spurn lesson plans, but we are also aware that all creative teachers plan. Whether teachers use this form or not, is not our concern. The purposes embraced by the form is, however, worthy of emphasis:

a) to center on response or behavior by students;

b) to encourage a change in behavior;

c) to encourage a change in instructional practice from

emphasis on presentation by the teacher, to performance by the student.

Note particularly, therefore, the nature of the language in which the plan for instructed learning is couched. The "tone" enables the plan to be used by the teacher (where the teacher prefers to direct the learning) or by the student (where the teacher prefers the student to undertake his own direction). Thus, where a school or part of an administrative unit -- finds it convenient to institute non-graded instruction, then the lesson cluster may be useful (as a Individualized Learning Activity Package -- LAP). As is obvious, the lesson plan has been written in such a way that it may be used by the student. On the other hand, where the administrative plan is to utilize a graded system, the lesson cluster may be used primarily by the teacher. Or, if the teacher wishes, the lesson plan may still be used as

an individualized assignment for individuals or groups.

Thus these two lesson clusters are given -- one centered in the Sciences (requiring some technique and equipment), and the other suggested in outline for the Social Sciences (requiring less specialized techniques).

A. A Plan for a Lesson-Cluster in Ekistics

Conceptual Scheme: Interdependence

Cognitive-Affective Scheme: In any given environment, organisms are linked within an ecosystem.

Objective of the Lesson Cluster: A continuing probe of chemical pollution: Are fertilizers pollutants?

Performance Objectives

Concept-Seeking: Students probe into the validity of the generalization: Fertilizers replenish the soil.

Value-Seeking: Students probe into the value of the practice of use of fertilizers.

Methods of Intelligence: Students observe action of fertilizers, investigate their utilization, hypothesize the effect of fertilizers on the environment.

An Initial Probe: Perhaps a team of researchers might set up an investigation to determine the effect of a fertilizer. (A useful fertilizer might be a liquid fertilizer sold at the florist for use with household plants).

Ten papercups containing vermiculite or washed sand are planted with 5 radish seeds each (at 1/4 inch depth). Five cups are watered with the fertilizer solution, the other five should be controls. Be sure to puncture the bottoms of the cups to drain off the water -- some (in five cups) with fertilizer in it.

Which plants show better growth? Why?

Fill two large glass jars half-full with pond or aquarium water. Add an equal amount of water plants to each. Place a netting on top of each jar. On top of the netting place the five cups to which fertilizer has been added. Place the controls on the other netting. Water (with fertilizer) as before.

What is your hypothesis on the growth of the water plants? Is your hypothesis supported by the evidence?

A continuing probe:

Probably the investigation above will take time. During the investigation, while observations are being made, readings of various types might be useful. Perhaps:

------ Reference A (the text)

------ Reference B (a library book)

------ Reference C (a magazine)

------ Reference D (students might search for newspaper articles.)

On the basis of the readings done, what might be the effect on the jar receiving

fertilizer? What observations might be necessary to determine whether the effect is that of fertilizer -- and not some other factor?

The probe continues:

Study a map of California. Find an agricultural area near a lake, or near a river feeding into the ocean.

What would happen if rains fell after the fields were fertilized?

What might happen to the growth of the plants in the lake or ocean?

Design an investigation which might be done to support or disprove your hypothesis? Is another hypothesis required?

Further Probes in Ekistics:

1) Is pollution of the waters by fertilizers like that of waters by:

a) detergents

b) human wastes

c) poisons such as mercury, or lead

d) pesticides such as DDT

2) What detergents does your family use?

Would the detergents aid growth of plants -- or hinder growth?

Design an investigation which might offer evidence. (The investigation might include reading and experiment.)

Probes Into Personal Behavior

By this time some tentative conclusions -- on the basis of all probes -- experiment, observation, reading -- may have been reached. What does the information gained suggest about the following:

a) Does the food you eat have any effect on your growth? How do you know?

b) Does a substance like alcohol (taken into the body) have an effect on behavior? How do you know?

c) Do drugs have an effect on behavior? Which drugs?

d) Substances (fertilizers, pesticides) affect growth of plants in the waters

of the globe. Do substances (food, drugs) affect growth of the body?

e) What substances in cigarettes affect the body? How do you know?

f) The effect of <u>harmful substances</u> on the seas and oceans, (the external environment) may be called <u>external pollution</u>. The effect of <u>harmful substances</u> on the body (the internal environment) may be called <u>internal pollution</u>.

What evidence is there -- in the community in which you live -- of:

a) external pollution

b) internal pollution.

What evidence can be gained from observation of behavior of people shown on TV of:

a) external pollution

b) internal pollution.

<u>Verifying Progress through Observation of Performance</u>	("Performance objectives" sometimes termed "Behavioral Objectives")
<u>Performance in Concept-Seeking</u>	There is an increased understanding of pollution effects of substances on the environment. The effects of such pollution can be identified. The possible harmful effects of <u>fertilizers</u> and <u>pesticides</u>

are explained. Newspaper and magazine articles are analyzed effectively to determine the possible effects of pollutants on the external and internal environments.

Performance in Value-seeking: Positions are taken on the practice of:

a) smoking

b) using drugs

c) pesticides

d) unwise use of fertilizers.

Performance: With some students smoking has decreased. Students can explain the effects of smoking. Students can explain the effects of drugs on the body -- and are probing their own behavior.

Students encourage their parents to purchase detergents that are bio-degradable.

B. An Outline for a Lesson-Cluster in the Social Sciences or the Humanities (6th level):

Objective of the Lesson Cluster: Observing Erosion in the City

Instructional Objectives: Concept-Seeking (City as Habitat and Habitation)

Value-Seeking (Comparing Beauty with Ugliness)

Methods of Intelligence: (Observation and Analysis)

Probes: Using cameras, drawings, stories, poems, children analyze their town or city as desirable or undesirable habitat and habitation.

Verifying Progress:

Performance Objectives: Children act to beautify (or make acceptable) the environment of the school; they decorate the classroom, remove trash and refuse, touch-up scaled paint. Parents report change of behavior at home.

Lesson clusters (examples preceding), are plans then for encouraging response to a learning situation by students; indeed, their learning is evidenced by activity. It is strongly assumed that activity by the student is more likely to result in a change in behavior, than is "telling" (lecturing, presenting) by the teacher. In the two lesson clusters planned and outlined, the behaviors in consolidation of learning (acquiring) and pioneering of learning (inquiry) have clearly emphasized that emphasis is on change of behavior. Each lesson cluster has then its performance objectives. These objectives may be shown to be attained through a change in these behaviors: conceptual, that is, understanding (recall, explanation, analysis, synthesis) or valuing (prizing desirable rather than undersirable ends). But the attainment of concepts and values must also be shown in some sort of action -- of performance (See Verifying Progress -- Lesson Clusters).

No one doubts that the attainment of some of these performance objectives can be "tested" by paper and pencil. But we would <u>insist</u> that the dominant form of proof of performance in <u>Ekistics</u> is indeed <u>performance</u> by the student. We do not insist that performance means a <u>permanent</u> change in behavior; only that it <u>may demonstrate</u> a first step in that direction. Too often students do things to please the teacher -- for good reason, not only the paltry one of achieving a grade. Nevertheless, if teachers also perform the role of ekistician, then students may gain further ego-strength in sustaining their own behavior. In Ekistics, as in all other areas of curriculum and instruction, the teacher <u>is</u> the key. Teaching style is above all a personal invention.

Performance Objectives in Ekistics:

As sampled in the classrooms of the United States

(the majority of observations were made in California)

Performance objectives are certainly not new. Thus we read from reports offered up in the 1950's:

> "The purposes of general education are better understood in terms of performance or behavior rather than more narrowly in terms of knowledge."

And the 1952 Yearbook of the National Society for the Study of Education, General Education, includes this quotation:

> "President Conant states he would amend the Harvard report,'General Education in a Free Society'... by stressing the'type of behavior' (italics ours) on which a free society depends rather than emphasizing the common knowledge and common values which influence the behavior of citizens."

In other words, a person's knowing something can best be determined by his doing something, by his behavior.

Behavioral or Performance objectives can be pervasive (operating throughout the general behavior of an individual), or special (operating in a special activity). For example:

Pervasive: TO DEVELOP AN ATTITUDE OF OPEN-MINDEDNESS: in expressing judgements where the data are obviously incomplete, tends to say something of the sort, "all the facts are not in; let's wait"; wants to hear both sides of the case; forms tentative conclusions.

Special: TO CONSERVE LIVING THINGS: in the field builds campfires properly; stamps them out after use; cleans up after a meal; checks safety devices at home.

Thus our preference for the form of a statement of performance or behavioral objectives is as follows:

Performance Objective (stated in upper case)

Performance Behavior (stated in lower case).

Thus, for each performance objective, there is suggested an observable behavior, or performance.

For purposes of assisting the teacher in developing performance objectives in Ekistics, a sampling -- within each Cognitive-Affective Conceptual Scheme -- is offered for consideration. The sampling, as we have indicated, comes out of our observations of teachers over the United States, the majority, nevertheless, in California.

Types of Performance Objectives

in relation to Ekistical Performance

in the Elementary School

Conceptual Pathway
A

Interdependence:

In Interchange of

Matter of Energy

Pervasive Performance Objective:

UNDERSTANDING OF INTERDEPENDENCE WITH THE ENVIRONMENT: Actions of children demonstrate their understanding through specific observable performances supporting the attainment of the objectives essential in the activities supporting Special Performance Objectives.

Types of Special Performance Objectives:

Level 1 (Please see grid). OBSERVES HIS SIMILARITY TO OTHER ORGANISMS: Cares for classroom pets; can grow a healthy plant from seed; can give an account of his care of a family pet; can give an account of needs of living things.

Level 2 SHARES A BEGINNING UNDERSTANDING OF THE NATURE OF DIFFERENT ENVIRONMENTS: Places a plant where it can get optimum conditions; can prepare a desert condition, or moderate, or wet, in a pot of terranium; can care for a sun-loving cactus or shade-loving fern.

Level 3 DEMONSTRATES INTERCHANGE OF MATTER AND ENERGY: Designs and carries out investigations to determine whether minerals are necessary for growth of a plant; can demonstrate the need for sunlight; distinguishes difference between humic and non-humic soil.

Level 4 DISTINGUISHES FOOD REQUIREMENTS OF DIFFERENT ORGANISMS: Describes an adequate diet for himself and selects appropriate food in the lunchroom; describes adequate requirements for a variety of plants, e.g., a green plant, a fungus, a desert plant, a jungle plant.

Level 5 DESCRIBES A VARIETY OF CHANGES IN THE ENVIRONMENT: Photographs desirable and undesirable changes in his environment (farm, home, town, city), and gives reasons for his choice; joins a group to conserve life in his environment (Scouts, Audubon, Keep America Beautiful, school group).

Level 6 EVALUATES A VARIETY OF CHANGES IN THE ENVIRONMENT INITIATED BY MAN: Aids in keeping his classroom clean; helps to decorate it. Describes the source of potable water in his community, methods of keeping it "unpolluted"; can analyze sources of pollution: e.g., smog, polluted streams, dirty or clean streets, and the like.

Conceptual Pathway
B

Interdependence:

In Social Interaction

Pervasive Performance Objective:

UNDERSTANDING OF THE SOCIAL INTERACTION REQUIRED TO MAINTAIN A SANATIVE ENVIRONMENT: Actions of children demonstrate they can and do plan to maintain a sanative environment, and perform accordingly.

Types of Special Performance Objectives

Level 1 (Please see grid). IDENTIFIES DIFFERENT HUMAN ENVIRONMENTS:

Identifies habitations in arctic, torrid, temperate climates; describes their characteristics.

Level 2 ANALYZES DIFFERENT ADAPTATIONS OF MEN IN THEIR HABITATIONS:

Builds (from available materials), igloo, or cottage; makes

models of dams, wells, or other forms of water supply.

Level 3 IDENTIFIES AND DESCRIBES A VARIETY OF RESOURCE-USES OF MAN: Makes models or paints forests, ranches, farm; grows, or draws, or paints different food, plants, or animals; helps plant a garden or window box, at home or school; helps plant trees or plants on lawn (Arbor Day, Independence Day).

Level 4 IDENTIFIES THE NEEDS OF HIS COMMUNITY AND IDENTIFIES THE SOURCES OF SUPPLY AND THE CONDITIONS OF HIS COMMUNITY: Knows the nature of work of his relatives; can describe his family's contribution to the community and how their needs are served; describes the source of food in his community, the source of wood, metals, fiber; can describe the source of food in the market, or green grocers.

Level 5 IDENTIFIES THE SOURCE OF THE RULES AND LAWS WHICH DETERMINE THE USES OF RESOURCES IN HIS COMMUNITY: States rules which

determine behavior in classroom, school grounds, parks, thoroughfares; visits town hall, or city council; takes part in school government; identifies at least one law affecting utilization of resources: forests, water, land, protection of plants, animals, people.

Level 6 ANALYZES HIS HOME AND COMMUNITY ENVIRONMENT AND IDENTIFIES THE SOCIAL ACTION UNDERLYING MODIFICATION OF THE ENVIRONMENT TO UTILIZE RESOURCES: Determines the basic nature of his town or city, agricultural, industrial, residential (and its past history); identifies economic reasons for change in his environment; identifies the agencies responsible for decision making; accepts <u>one</u> responsibility or duty in changing the school environment (e.g., class representative, member of a school organization, and the like).

Conceptual Pathway
C

Interdependence:

in cultural components and forms.

Pervasive Performance Objectives:

UNDERSTANDING OF THE OBJECTS AND EVENTS WHICH ARE SYMBOLIC OF AESTHETIC BEHAVIOR:

Actions of children demonstrate their behavior in understanding and maintaining the cultural components which undergird an environment which satisfies the aesthetic aspects of life.

Types of Special Performance Objectives:

Level 1 (Please see grid). LIKES ENVIRONMENTS WHICH ARE "SANATIVE" IN NATURE: In discussing TV programs, shows preference for those defining environments of beauty; chooses plants and pictures in decorating his home and classroom; shows liking for stories, poetry, music.

Level 2 PREFERS AND SELECTS OBJECTS SYMBOLIC OF BEAUTY: Given choices (-- music, art, through slides, objects, paints, and the like) can explain reasons for choice; helps in decorating the school and classroom with pictures; picks up refuse.

Level 3 CHILDREN GAIN IN CRAFTSMANSHIP: Make objects (sculptures, pictures, bric-a-brac) which express their need to decorate their surroundings;gains in ability to place objects in a room with regard to aesthetic principle; able to do simple things to "fix" objects.

Level 4 IDENTIFY CULTURAL COMPONENTS AND FORMS: Can identify cultural components (e.g., music, art, dance) of western as well as an eastern culture; show beginning activity and gain in performance in one aspect (form) of culture: music, art, dance, drama, literature (poetry), film, photography.

Level 5 CREATE OBJECT, EVENT, OR ENGAGE IN BEHAVIOR SYMBOLIC OF THEIR CRITERIA OF BEAUTY: Take photographs of environments symbolizing aesthetic value, or lacking them; show use of color, or design, in painting pictures, or arranging objects; choose records or poems related to their criteria of beauty; state their criteria of beauty and defend them.

Level 6 ACT TO CONSERVE THE ENVIRONMENT: By personal behavior, (joins a conservation group and acts in accordance with its program, e.g., does not destroy plants or animals; assists in maintaining the environment around his schools); joins groups to "clean up" the environment; can state concepts and values underlying ekistical behavior; collects and displays articles on bulletin board showing conservation successes and failures in his community; reports on

ekistical success reported on TV; through various statements and acts shows commitment to maintaining a sanative environment.

As a result of his activities in Ekistics, the child now has a cognitive-affective base to undergird further inquiring into the nature of the environment, its deprivation, its shortages, and the methods by which it can be redeemed and replenished; in other words, the child has an ekistical base to undergird his inquiry.

The teacher will not fail to note the "activity", or "process" or "inquiry terms" which have pervaded these types of performances objectives offered by way of example. In doing the child inquires.

Types of Performance Objectives

in relation to Ekistical Performance

in the Junior High School

Pervasive Performance Objective:

YOUNG PEOPLE PROBE THE URBAN ENVIRONMENT IN ORDER TO UNDERSTAND ENVIRONMENTAL ISSUES AND PROJECTED "SOLUTIONS": Activities are planned and designed to understand the nature of the urban environment as part of the ecosystem; the ecosystem is probed through laboratory and field study; a first thrust into the socio-economic is designed in order to probe the social, political, economic bases of ekistical decision; techniques of measuring environmental change are used in all investigations, as basic tools of inquiry.

Types of Special Performance Objectives (Junior High School Students)

(a) STUDENTS PROBE THE TECHNOLOGY PRESENTLY AVAILABLE IN RELATION TO ITS EFFECT ON THE ENVIRONMENT: Young people probe into the nature of combustion, external and internal, to determine products of combustion (e.g., fires, engines, smoking); probes into communication and transportation (automobiles, trucks, planes, roads, and the like); probes into methods of disposal of effluent and wastes (determination of the nature of biological magnification and eutrophication, through human waste, fertilizer, detergent, pesticides, garbage, etc.), and amelioration; determination of personal and group action in relation to amelioration of effects of modern technology.

(b) STUDENTS PROBE THE COMMUNITY TO DETERMINE THE ORIGINS AND ATTEMPTS AT SOLUTION OF EKISTICAL PROBLEMS: Young people inquire into and make a record of the present status of the community through photographs, film, description, drawing, art, tape, and

analyze these in terms of the criteria of a sanative environment; interpret the reports on press and TV and the comments and acts of their particular legislative body in relative to the environment; determine the role of the citizen in maintaining appropriate ekistical action; plan for personal and group action in relation to the maintenance of a sanative environment.

Types of Performance Objectives

in relation to Ekistical Performance

in the Senior High School

Pervasive Performance Objective:

STUDENTS PROBE SPECIFIC ECOSYSTEMS, AND THE PLANETARY ECOSYSTEM, TO DETERMINE THE CONCEPTS AND VALUES WHICH MAY DETERMINE SURVIVAL OF LIFE: Students analyze and synthesize prior ekistical experience into concepts and values which form a base for appropriate action in maintaining a sanative environment; students inquire into the major ecological problems affecting the ecosystem -- pollution and population; students conduct inquiry into the pressure on resources and organization of shortage to determine their personal and group action in ameliorating ecological problems.

Types of Performance Objectives:

(a) STUDENTS DEVELOP AN EKISTICAL BASE FOR ANALYZING DEPRIVATION OF THE ECOSYSTEM: Identify signs of deprivation of the ecosystem (e.g., signs of biological magnification and eutrophication); analyze and determine significant methods of ameliorating deprivation and restoring balance through appropriate use of technology (e.g., uses of biodegradable materials, utilization of waste and fill); determine the relation to institution of appropriate technological devices to "cure" environmental ills and shortages (e.g., introduction of plans to develop viable plans for housing, zoning, and the like).

(b) STUDENTS PROBE TECHNOLOGICAL AND SOCIAL DEVICES VALUABLE IN THE ORGANIZATION OF SHORTAGE: An inquiry into the nature of have and have-not economics (particularly in relation to food, fiber, and metals) to determine the present status of the United States; determination of personal and group responsibility in maintaining the

United States (in relation to the planetary ecosystem) in a state of economic health relative to maintaining a sanative environment; a determination of concepts and values to be utilized in maintaining an environment fit for life -- and fit for man.

(c) STUDENTS DETERMINE THE EKISTICAL CONDITIONS WHICH HAVE RESULTED IN A LIST OF "ENDANGERED SPECIES": Students enquire into the validity of the addition of the last-named species to the list of endangered mammalian species, and the action necessary to avoid the catastrophe.

RARE & ENDANGERED MAMMALS

OF THE UNITED STATES*

Mammals	Status	Reason For Decline
1. Indiana Bat	Endangered	Commercialization of caves in Indiana; vandals; insecticide poisoning.

* The list comprising 25 species has been compiled by Michael P. Dumont, Curator, Mammology, American Museum of Natural History.

We have added -- with deep concern -- a 26th, which is possibly endangered.

Mammals	Status	Reason For Decline
2. Utah Prairie Dog	Endangered	Disease and suppression because of records of infection with sylvatic plague.
3. Kaibab Squirrel	Rare	Automobile traffic and disease the most conspicuous causes of mortality.
4. Delmarva Peninsula Fox Squirrel	Endangered	Disruption of habitat through timber cutting, construction, road building; hunting for food and sport.
5. Eastern Timber Wolf	Endangered	Heavy hunting and trapping pressure for bounty; encroachment of civilization.
6. Texas Red Wolf	Endangered	Heavy trapping and hunting pressures; inability to compete with more aggressive coyote.
7. San Joaquin Kit Fox	Endangered	Reduction of habitat, cultivation. Highly susceptible to rodenticides which have been widely used in area. Excessive hunting.
8. Glacier Bear	Rare	Overhunting as a curio; About 500 left.
9. Black-Footed Ferret	Verge of extinction	Poisoning directed at rodents; elimination of natural prey and den holes.
10. Southern Sea Otter	Rare, once Nearly Extinct	Slaughtered for furs in latter half of 18th century; absent off coasts of Washington and Oregon since 1876. Presently being persecuted by abalone fisherman off California.

Mammals	Status	Reason For Decline
11. Florida Panther	Endangered. Close to extinction.	Heavy trapping and hunting pressures; pressures of civilization.
12. Caribbean Monk Seal	Endangered. May be extinct.	Indiscriminately slain since early Spanish days.
13. Guadalupe Fur Seal	Endangered. Slow increase in numbers.	Sealing in the 1880's -- once believed extinct.
14. Florida Manatee or Florida Sea Cow	Endangered.	Hunting for flesh, oil and skins; wanton slaughter for "sport", silting of coastal feeding grounds.
15. Key Deer	Endangered. Apparently slowly increasing.	Development and occupation of islands by man.
16. Columbian White-tailed Deer	Endangered.	Loss of habitat; bottom lands being cleared for agriculture and industry.
17. Sonoran Pronghorn	Endangered. Reduced in range and numbers.	Competition by domestic cattle and horses; overshooting and poaching.

Peripheral species may not be endangered everywhere; their retention in our Nation's fauna is a matter of concern.

18. Coatimundi or Chula

19. Jaguar

Mammals	Status	Reason For Decline
20. Jaguarundi		
21. Ocelot	Critical in Mexico.	Its decrease is due to clearing brush habitat and sale of pelts as curios.
22. Margay	Exceedingly rare animal.	
23. Woodland Caribou		
24. Mountain Caribou		
25. Musk Ox		
26. Man		

What is the end of Ekistics: To live in harmony with our environment; certainly. To live responsibly and sensitively as stewards of the environment; certainly. To sustain a culture which maintains an environment which is sanative, and cherishes the beauty which makes life and living noble; certainly.

Earlier we suggested that a people which disavows its future does not need to plan for the future. Man has a future, but it depends, in part, on the choice of the image by which he would live.

One image of man, an apostrophe, by Shakespeare, paints him thus:

> But man, proud man
> Drest in a little brief authority
> Most ignorant of what he is most assured
> His glassy essence, like an angry ape,
> Plays such fantastic tricks before high heaven
> As make the angels weep.

What tricks man has played on the environment which sustains him. But there is another; it is not strange that it is also Shakespeare's:

> What a piece of work is a man!
> How noble in reason!
> How infinite in faculty!
> In form and moving, how express and admirable!
> In action how like an angel!
> In apprehension how like a god!

Man need not be a god to save his environment.

He need only be man, fulfilling his powers in the pursuit of excellence, in competence and compassion.

A 32-page Bibliography follows